



KOPPERS

Specifications



KOPPERS *Old Style* PITCH

KOPPERS TAR-SATURATED FELT

**BUILT-UP ROOFING
WATERPROOFING
DAMPPROOFING
FLASHING
ROOF INSULATION**

KOPPERS COMPANY TAR AND CHEMICAL DIVISION, PITTSBURGH, PA.

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ALL KOPPERS ROOFING SPECIFICATIONS ARE WRITTEN IN BLANK

In this catalog you will find complete standard specifications for all types of coal tar pitch and tarred felt roofs. *All these specifications are written in blank.* No manufacturer's materials are mentioned in the body of any one of them. The only reference to Koppers or to any Koppers products in the roofing specifications is in the section on materials where you will find the statement: "Materials shall be those as manufactured by the

Koppers Company,.....Company,.....Company, or approved equal applied according to the above specifications."

You may safely turn any of these roofing specifications over to your stenographer and have her copy them for your master specifications. In compiling them, we have been guided by standard, accepted practices.

MATERIALS SPECIFICATIONS

KOPPERS APPROVED TARRED FELT meets the fifteen (15) pound tarred felt specifications indicated in this catalog. Koppers Approved Tarred Felt meets the following specifications: The Underwriters' Laboratories; Federal Specifications No. HH-F-201; and A.S.T.M. D-227-27.

KOPPERS OLD STYLE PITCH complies with the following standard specifications:

U. S. Government Master Specifications R. P.-381 (Federal Specifications Board)—"Coal Tar Pitch for Roofing."

A. S. T. M. D.-252-27—"High Bitumen Coal Tar Pitch for use in Constructing Built-up Roofs Surfaced with Slag or Gravel."

Underwriters' Laboratories.

THE ADVANTAGES OF THE FLAT DECK ROOFS

Flat roof decks are economical to construct and maintain and they are particularly useful on two or three-story buildings erected on foundations designed to carry additional stories. They are usually more pleasing architecturally; they often permit better ventilation and they make possible the high and low bay type of construction which delivers better light in industrial buildings.

THE ADVANTAGES OF COAL TAR PITCH FOR FLAT ROOFS

Two important questions should be asked about any roofing to be applied on flat decks:

1. Can it resist prolonged contact with water without deteriorating?
2. Does it have the ability to heal itself automatically?

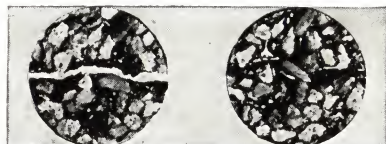
Roofs built with KOPPERS Coal Tar Pitch do resist water and they do heal themselves.



Many Koppers Roofs like this, where water lies constantly or intermittently as part of the air-conditioning system, prove the ability of Koppers Coal Tar Pitch and Tarred Felt to resist deterioration in the presence of water

1. RESISTANCE TO WATER. Prolonged contact with water is a condition almost impossible to avoid on flat roofs. Poor drainage, low spots, or settlement of the building may cause it. Service records of 15 to 50 years by coal tar pitch roofs with little or no attention prove the resistance of tar to water. KOPPERS Coal Tar Pitch is practically insoluble in water. None of its constituents has more than a slight water solubility. It contains no added fillers that would induce water absorption or emulsification.

2. THE SELF-HEALING PROPERTY.



Broken (for Test)

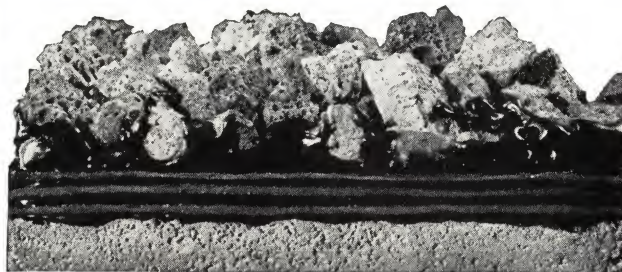
Self-healed at Ordinary Summer Roof Temperature

These photomicrographs show how a Koppers Coal Tar Pitch Roof self-heals any small breaks which occur

ing and rapid changes in atmospheric conditions can cause cracks in the top surfaces of some types of roofing. However, the vital consideration is whether these cracks are permanent if they do appear. Coal tar pitch has a property technically known as "cold flow" and even at ordinary temperatures cracks in the surface heal themselves. This can clearly be seen in photomicrographs which show the sides of the cracks moving slowly together until complete fusion takes place and the pitch again forms a continuous layer. Coal tar pitch roofs readily conform to slight irregularities in the deck and yet remain waterproof.



THE EXTRA-HEAVY TOP POURING. Additional protection is given a KOPPERS Roof by the extra-heavy top of roofing pitch which is poured on (not mopped). This pouring amounts to approximately 70 pounds for pitch for every 100 square feet of roof surface.



Enlarged Photograph of a Cross-Section of a Koppers Roof Over a Concrete Roof Deck

Arrows indicate layers of Koppers Approved Tarred Felt. Other layers are Koppers Old Style Pitch

THE GRAVEL OR SLAG SURFACE. The gravel or slag surface on a KOPPERS Roof provides an armor against hail, driving rain, sleet and snow. It also provides additional wearing surface which protects the roof against foot traffic. Roofs with gravel or slag surfaces cling to the deck even in severe wind storms.

THE EXTRA SATURATION OF THE FELT. The tarred felt used in KOPPERS Roofs absorbs one and one-half times its own weight of coal tar pitch during saturation. This large proportion of saturant insures high strength and maximum durability.

PRESERVATIVE AND NON - CORROSIVE ACTION. KOPPERS Old Style Pitch contains coal tar creosote, which is unsurpassed as a preservative for wood, felt or other materials which are used in roofing construction. It contains no mineral acids, alkalies, or corrosive substances and therefore cannot corrode metal surfaces with which it may come in contact.

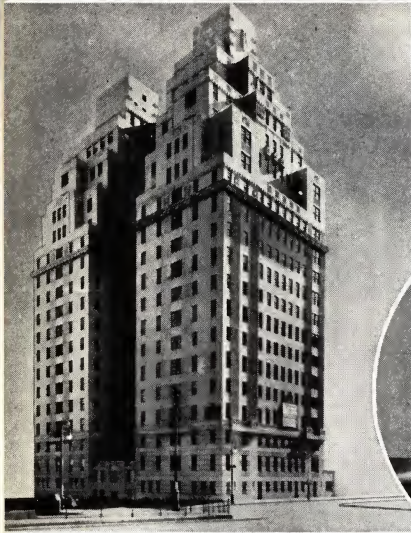
WEIGHTS, CONTAINERS, ETC. KOPPERS Old Style Pitch is sold in barrels or metal containers, 450 to 500 lbs.

KOPPERS Tarred Felts are sold in standard size rolls, 32 inches wide and containing 432 square feet, except when otherwise specified. KOPPERS Approved Tarred Felt, the highest grade of roofing and waterproofing felt and the grade used in KOPPERS Bonded Roofs, has an approximate average weight of 15 lbs. per 100 sq. ft., or 65 lbs. per roll.

BOND. Maintenance Bonds on KOPPERS Roofing and Flashings are issued by Koppers Company and the National Surety Corporation on roofs constructed according to Koppers specifications and when applied by roofing contractors approved in writing by Koppers Company. When KOPPERS Bonded Roofing with KOPPERS Bonded Flashings are specified, this company will have an inspector on the job to see that it is constructed according to the specifications. The bond protects the building owner against any roofing maintenance expense due to leakage for the period of the bond. It is issued for 10, 15 or 20 years.

Note—Koppers Company will issue Guarantee Roofing Bonds in such portions of the United States as are covered by its inspection service.

PROMINENT BUILDINGS ON WHICH KOPPERS ROOFING



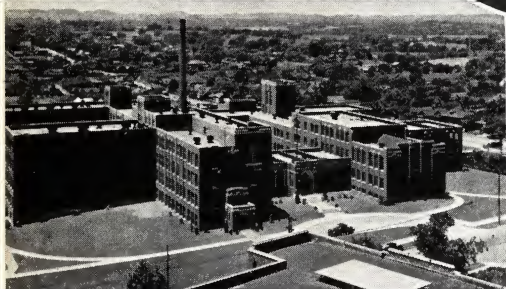
Apartment—895 Park
Avenue, New York City

Western Union Building
230 Congress St., Boston



Ward Baking Company
Cleveland, Ohio

Sears, Roebuck & Co. Build-
ing, Memphis, Tennessee



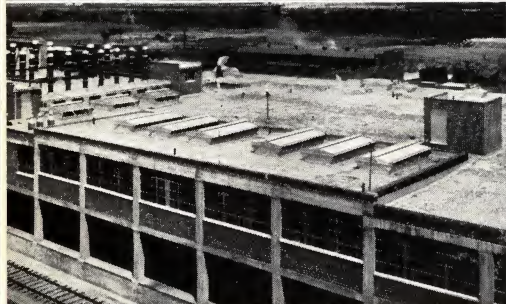
Meharry Medical College
Nashville, Tennessee



U. S. Post Office, Rochester, New York



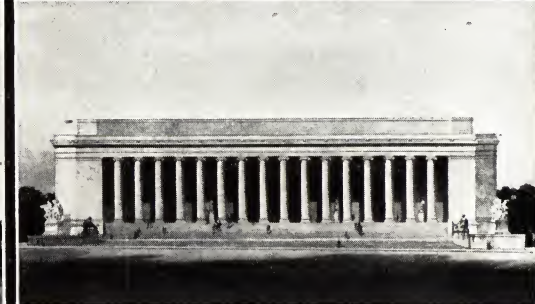
Indiana State Library and Historical
Building, Indianapolis, Indiana



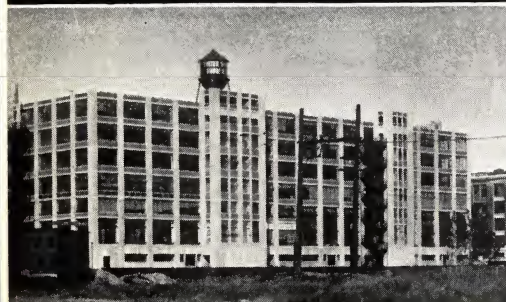
Kroger Grocery and Baking Company
Cincinnati, Ohio



Westinghouse Electric & Mfg. Co.
Newark, New Jersey



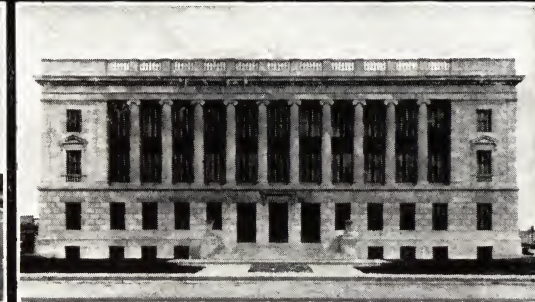
Mellon Institute of Industrial Research
Pittsburgh, Pa.



United States Rubber Co.,
Passaic, New Jersey



Central High School
Greensboro, North Carolina



Wilbarger County Court House
Vernon, Texas



Pennsylvania Railroad Freight Station, Chicago, Ill.



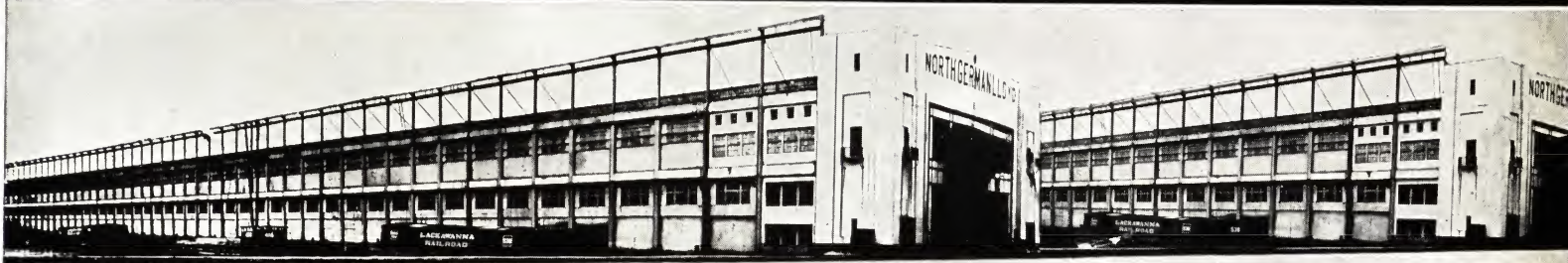
State of Texas Building, Dallas, Tex.

KOPPERS ROOFING SPECIFICATIONS

OR WATERPROOFING MATERIALS HAVE BEEN APPLIED



Navy and Munitions Building, Seventeenth and B, Southwest, Washington, D. C.



U. S. Shipping Board Merchant Fleet Corp., Brooklyn, N. Y.



Allis-Chalmers Co. Tractor Assembly Building No. 4, Springfield, Ill.



Coca-Cola Building
Atlanta, Georgia



Merchants & Manufactur-
ers Bldg., Houston, Texas



St. Louis Globe Democrat
Building, St. Louis, Mo.



Long-Lewis Hardware Company,
Birmingham, Alabama



Texas and Pacific
Railroad
Passenger
Station, Fort
Worth, Texas



Pennsylvania Railroad Office
Building, Philadelphia, Pa.

Worcester
Memorial Aud-
itorium, Wor-
cester, Mass



KOPPERS ROOFING SPECIFICATIONS

PROMINENT BUILDINGS ON WHICH KOPPERS ROOFING

6
7

Name	Location	Roofer	Architect
ALABAMA			
Thomas Jefferson Hotel West End High School B. F. Goodrich Tire Co. Building Lanett Cotton Mills & Bleachery	Birmingham Birmingham Birmingham Lanett	Hahn Roofing and Heating Co. Birmingham Fur. and Rfg. Co. Hahn Roofing and Heating Co. O. A. Smith Co.	D. O. Whilden Warren Knight & Davis Owner J. E. Serrine Co.
ARKANSAS			
North Little Rock High School State A. M. and N. School	N. Little Rock Pine Bluff	Williams Roofing Co. Williams Roofing Co.	Mann Wanger & King Thompson Sanders & Ginnocchio
COLORADO			
A. T. & S. F. Ry. Co., Roundhouse	La Junta	Lydick Roofing Co.	Company Engineer
CONNECTICUT			
United States Coast Guard Academy Norwich State Hospital Grosvenor Dale Co., Building No. 5, Mill No. 2	New London Norwich No. Grosvenordale	Johnson Rfg. & Sht. Mt. Wks. Johnson Rfg. & Sht. Mt. Wks. Eagle Cornice Co.	U. S. Government Cudworth & Thompson P. W. Dalrymple
DELAWARE			
Laurel High School	Laurel	Roofing and Improve. Co.	Guilbert & Bettelle
DISTRICT OF COLUMBIA			
Potomac Electric Power Co. Southern Railway Office Building Navy and Munitions Building	Bennings Washington Washington	Ironclad Roofing Co. Ironclad Roofing Co. W. F. Overly	Stone & Webster Waddy B. Wood U. S. Government
GEORGIA			
Goodyear Tire & Rubber Co., Inc. Lucky Operating Co., Canda Dry Co. Uxbridge Worsted Co. University Hospital	Rockmart Atlanta Macon Augusta	Birmingham Fur. & Rfg. Co. O. A. Smith Co. J. Roy Martin Acme Rfg., Htg. & Mtl. Co.	Owner E. C. Seiz J. E. Serrine Co. Scroggs & Ewin
ILLINOIS			
Allis-Chalmers Co., Tractor Assembly Building No. 4 Sanitary District of Chicago Peoples Gas Light and Coke Co. Jackson-Franklin Building John Hill Junior High School Pennsylvania R. R. Freight Station Standard Brands Vinegar House	Springfield Chicago Chicago Chicago Chicago Chicago Chicago	Chicago Roofing & Supply Co. Luse Stevenson Co. F. D. Renaud Luse Stevenson Co. B. M. Dennis and Son Luse Stevenson Co. Jacobson Roofing Co.	Helmle & Helmle Owner Owner Alfred S. Alschuler Brooks Bramhall Owner W. C. Bennett
INDIANA			
Lever Bros. Co. Kraft-Phenix Cheese Corp. Schenley Distillery Warehouse	Hammond Sullivan Lawrenceburg	Chicago Rfg. and Sup. Co. J. J. Dunne Roofing Co. Warren Ehret Co.	Chas. T. Main, Inc. Owners Carl. J. Keifer
KENTUCKY			
C. & O. R R, Roundhouse Martin Brown Building Eastern Kentucky State Teachers Col- lege (Addition to Library Building) Louisville Gas & Electric Co.	Stevens Louisville Richmond Louisville	W. F. Overly & Sons Samuel F. Troxell Co. Robert B. Pace Samuel F. Troxell Co.	Owner Owner C. C. & S. K. Weber, Inc. Byllesby Engineering & Management Corp.
LOUISIANA			
Lake Charles Harbor & Terminal Co. Pittsburgh Plate Glass Co., Warehouse New Orleans Compress Co., Warehouse	Lake Charles New Orleans New Orleans	Louisiana Western Lumber Co. J. J. Clarke Co. Clifford Favrot Supply Co.	Owner Favrot & Livaudais J. F. Coleman Engr. Co.
MAINE			
Boys' Club	Portland	M. B. Bourne & Son	J. C. & J. H. Stevens
MARYLAND			
United States Parcel Post Building	Baltimore	Ehret Rfg. and Mfg. Co.	Bishop Knowlton & Carson
Pangborn Corp., New Warehouse Merchants Terminal Corp., Cold Storage Warehouse	Hagerstown Baltimore	Tri-State Roofing Co. J. O. White Co.	Owner J. H. Wilkersham
MASSACHUSETTS			
Western Union Telegraph Co. Boston Consolidated Gas Co. Bigelow-Sanford Carpet Co. New England Tel. & Tel. Co.	Boston Jamaica Plain Clinton Lynn	Finnegan Roofing Co. Columbia Cornice Co. Eagle Cornice & Skylight Wks. Eagle Cornice & Skylight Wks.	Stone & Webster Rust Engineering Co. G. H. Hayter Densmore, LeClair & Robbins
Commonwealth of Massachusetts Industrial Building Pepperell Mfg. Co.	Norfolk Fall River	Atlas Roofing & Skylight Wks. Farber Sht. Metl. & Rfg. Co.	McLaughlin & Burr Owner
MICHIGAN			
Detroit House of Correction Springwell Filtration Plant Grace Hospital Memorial Building S. S. Kresge Co. Linde Air Products Co. Building	Detroit Detroit Detroit Flint Detroit	John D. Busch C. R. Woolensack Michigan Roofing & Cornice Co. Edwin Sterner Co. Schreiber Bros., Inc.	Albert Kahn, Inc. City of Detroit Albert Kahn, Inc. Owners Owner
MINNESOTA			
International Harvester Company	St. Cloud	W. S. Nott Company	Owner
MISSISSIPPI			
Standard Life Insurance Co.	Jackson	Ray Wright Rfg. & Sht. Mtl. Wks.	N. W. Overstreet
MISSOURI			
Washington University Power House Sears, Roebuck & Co.—2 Stores Monsanto Chemical Co. Building	St. Louis St. Louis St. Louis	St. Louis Roofing Co. Biebel Bros. Roofing Co. Swift Roofing Co.	Baumes-McDevitt Co. Nimmons Carr & Wright Mauran Russell & Crowell
M. K. Goetz Brewing Co. Webster Groves Junior High School International Harvester Co.	Kansas City Webster Groves St. Louis	Sellers & Marquis P. W. Finger Roofing Co. St. Louis Roofing Co.	Geo. L. Lehle Wm. B. Ittner Owner
NEBRASKA			
Morton School	Hastings	J. H. Still & Co.	M. L. Evans
NEW HAMPSHIRE			
Union Leader Publishing Co. Gulf Refining Co., Service Station	Manchester Hanover	M. J. Murphy The A. C. Hathorne Co.	Lockwood, Greene, Inc.
NEW JERSEY			
General Motors Corporation New York Central Railroad United States Rubber Co. Lehigh Warehouse Trans. Co. Aluminum Co. of America, Factory Building Hudson County Tuberculosis Hospital National Bearing Metals Corp.	Linden Weehawken Passaic Newark Edgewater Jersey City Jersey City	M. H. Donovan & Co. Cooper & Co. T. F. Sloan Co. J. Steinberg & Son Cunningham Roofing Co. Jacob Ringle & Sons, Inc. A. Ratner & Co.	Albert Kahn Owner Lockwood, Greene, Inc. Fletcher-Thompson Co. Owners John T. Rowland Leroy Cowan

KOPPERS ROOFING SPECIFICATIONS

Name	Location	Roofer	Architect
NEW YORK			
General Railway Signal Co.	Rochester	Flesch & Schmitt, Inc.	Gordon & Kaelber
Riverside High School	Buffalo	Rademacher Bros.	F. J. & W. A. Kidd
Jewish Y. M. & W. Association Building	Rochester	Flesch & Schmitt, Inc.	S. Firestone
City of Albany Filtration Building	Albany	United Roofing Co.	W. H. Emory, Jr.
Jefferson High School	New Rochelle	Kay Roofing Co.	Starrett & Van Vleck
Kings County Hospital	Brooklyn	Sobel & Krause	Leroy P. Ward
Creedmore State Hospital	Creedmore, L. I.	Bushwick Cornice Wks.	State of New York
United States Post Office	Brooklyn	A. Ratner Co.	U. S. Government
Pilgrim State Hospital	Brentwood, L. I.	Bushwick Cornice Wks.	State of New York
New York State Hospital for Insane	Central Islip	Supreme Sheet Metal Wks.	State of New York
Board of Transportation	New York	New York Roofing Co.	Owner
Brooklyn Court House	Brooklyn	Chrystie Cornice Wks.	Collens & Collens
Brooklyn Borough Gas Co.	Brooklyn	Thos. Flanagan, Jr.	Black & Heas
Sing Sing Prison	Ossining	Bushwick Cornice Wks.	State of New York
Pier 21—North River	New York	Jacob Ringle & Son	Owner
Sheffield Farms Co., Inc.	New York	Sheridan Roofing Co.	Owner
Bronx Terminal Market	Bronx	Bushwick Cornice Wks.	Louis, Chandler & Mills
Continental Can Co.	Syracuse	Sheridan Roofing Co.	Owner
United States Shipping Board	Brooklyn	Bushwick Cornice Wks.	Cass Gilbert
Boulevard Garden Apartments	Woodside, L. I.	Bushwick Cornice Wks.	Theo. Englehart
News Syndicate Co.	Brooklyn	J. J. Fisher Co.	Lockwood, Greene, Inc
United States Military Academy	West Point	Chrystie Cornice & Skylight Wks.	Owners
Carborundum Co., Buildings No. 10, 11, and 12	Niagara Falls	Jos. A. Sanders, Inc.	Owner
Distilled Liquors Corp.	Lyons	Flesch & Schmitt, Inc.	Henri Vallet
Monroe County Home—Unit No. 4	Brighton	George Ballard	S. Firestone
NORTH CAROLINA			
Junior High School	High Point	S. O. Peebles	Harry Barton
Lucky Strike Factory	Durham	Budd-Piper Roofing Co.	Owner
McEwen Knitting Co. Mill	Burlington	F. B. Ingold	J. E. Sirrinc
OHIO			
DeVilbiss High School	Toledo	Schreiber Roofing Co.	Edwin Gee
Seiberling Rubber Co.	Barberton	Akers & Harpham	Owner
The May Co.	Cleveland	A. L. Sacheroff	Graham, Anderson, Probst & White
Loose-Wiles Baking Co.—Carton Plant	Dayton	Schriber Sheet Metal & Roofers	Owner
American Tobacco Co.	Dayton	Schriber Sheet Metal & Roofers	Owner
Carnation Co.—Condenser House	Coshocton	Akers & Harpham	Owner
OKLAHOMA			
J. C. Penney Co., Inc.	Tulsa	Corson Roofing Co.	Owner
Prest-O-Lite Co.	Oklahoma City	Swanda Bros.	Owner
Frisco Union Depot	Oklahoma City	C. C. Cooke Co.	Owner
PENNSYLVANIA			
Wm. Penn Hotel Addition	Pittsburgh	Chas. H. Hahn	Jannsen & Cocken
State Farm Show Buildings	Harrisburg	W. F. Overly & Sons	Lowrie & Green
H. J. Heinz Auditorium	Pittsburgh	Warren-Ehret Co.	Albert Kahn
New Allegheny General Hospital	Pittsburgh	East Liberty Coal & Supply Co.	York & Sawyer
University of Pittsburgh—Cathedral of Learning	Pittsburgh	Chas. H. Hahn	Owen D. Stephens
Allegheny County Home	Woodville	Warren-Ehret Co.	J. Lawrence Hopp
United States Bureau of Mines	Pittsburgh	Tri-State Roofing Co.	Lawrence Wolf
State Highway Garage	Merco	Warren-Ehret Co.	Owner
Pittsburgh & Lake Erie R. R.—Train Sheds	Pittsburgh	Warren-Ehret Co.	Owner
Gotham Silk Hosiery Mill	Philadelphia	Joseph Rammacher	Owner
Westinghouse Electric & Manufacturing Co., Warehouse	Pittsburgh	Warren-Ehret Co.	Owner
Hookless Fastener Co., Building "D"	Meadville	Warren-Ehret Co.	Owner
Jos. S. Finch Co., Warehouse No 11	Schenley	Tri-State Roofing Co.	Carl Keifer
Middletown Air Depot	Harrisburg	Louis Ruger	Owner
RHODE ISLAND			
United Electric Railways Co.	Providence	Maguire Roofing Co.	Owners
Providence Journal Building	Providence	M. N. Cartier & Sons	Albert Kahn
SOUTH CAROLINA			
Gaffney Mfg. Co., Cotton Mill	Gaffney	Builders Roofing Co.	Lockwood, Green, Inc.
S. H. Kress Co.	Charleston	Charleston Sheet Metal Wks.	Owner
Gluck Mill	Anderson	J. Roy Martin	J. E. Sirrinc Co.
Aragon Baldwin Mills	Chester	F. B. Ingold Co.	J. E. Sirrinc Co.
Kendall Mills	Newberry	J. Roy Martin	Lockwood, Green, Inc.
TENNESSEE			
United States Aluminum Co.	Alcoa	W. F. Overly & Sons	Owner
Central Hospital for Insane	Nashville	Taylor Roofing Co.	Marr & Holman
McHarry Medical College Hospital	Nashville	Taylor Roofing Co.	Gordon & Kaelber
American Bakeries	Knoxville	Jay Roehl Co.	Bauman & Bauman
TEXAS			
South Junior High School	Beaumont	Gulf Coast Roofing Co.	Livesay & Wiederman
Harlandale Junior High School	San Antonio	Joe Dean Sheet Metal Wks.	Morris & Noonan
Southwestern Bell Telephone Co.	Dallas	Rogers Asbestos Co.	Lang & Witchell
Federal Bank Building	Houston	Rogers Asbestos Co.	Hedrick & Gottlieb
Thomas Jefferson Senior High School	San Antonio	Samuel Dean	Adams & Adams
Texas & Pacific Railway Co.	Brownsville	Guarantee Roofing Co.	None
University of Texas	Austin	Parker Roofing Co.	Greene, LaRoche & Dahl
VERMONT			
Gulf Refining Co., Lubratorium	Barre	The A. C. Hathorne Co.	Owner
VIRGINIA			
Norfolk & Western Railway Co.	Lamberts Point	T. B. Dornin-Adams Co., Inc.	Owner
Sternheimer Bros., Warehouse	Richmond	Piper Roofing Co.	J. Binford Walford
Industrial Rayon Corp.	Covington	Warren-Ehret Co.	Christian-Schwartz-berger & Gaede
WISCONSIN			
Wisconsin Telephone Co.	Milwaukee	F. J. A. Christiansen	Eschweiler & Eschweiler
Milwaukee County Court House	Milwaukee	F. J. A. Christiansen	Albert Randolph Ross
Lake Bluff School	Shorewood	Cream City Roofing Co.	Eschweiler & Eschweiler
Addition to Milwaukee Hospital	Milwaukee	F. J. A. Christiansen	Clas & Clas
Seaman Body Corp., Unit No. 14	Milwaukee	F. J. A. Christiansen	Owner
The Plankington Trust Dept. Store	Milwaukee	F. J. A. Christiansen	Kirchoff & Rose
Blatz Brewing Co., Case Storage Building	Milwaukee	F. J. A. Christiansen	Geo. L. Lehly
Rufus King High School	Milwaukee	F. J. A. Christiansen	School Board
WEST VIRGINIA			
Chesapeake & Ohio Railway Co.	Huntington	West Virginia-Kentucky Hardware & Supply Co.	Owner
Carbide & Carbon Chemicals Corp.	So. Charleston	J. E. Harris Co.	Owner

5 PLY OVER WOOD DECKS

KOPPERS 20-YEAR BUILT UP ROOFING SPECIFICATION NO. 1

(Maximum Incline Two (2) Inches Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be clean, smooth and free from knot holes, large cracks, and loose boards. The lumber shall be seasoned or treated. If the roof deck is inclined it shall be properly sloped to the outlets.

APPLICATION OF ROOFING MATERIAL. First—Lay one (1) thickness of sheathing paper, weighing not less than five (5) pounds per one hundred (100) square feet, lapping each sheet one (1) inch over the preceding sheet.

Second—Lay over the entire surface two (2) full thicknesses of Tarred Felt, lapping each sheet seventeen (17) inches over the preceding sheet. Nail as often as necessary to hold the sheets in place and until the remaining felt is laid.

Third—Apply over the entire surface a uniform coating of Coal Tar Pitch.

Fourth—Lay over the entire surface three (3) full thicknesses of Tarred Felt, lapping each sheet twenty-two (22) inches over the preceding sheet and mopping with Coal Tar Pitch the full width of the twenty-two (22) inch lap, so that in no place shall felt touch felt. Each sheet shall be nailed not less than two (2) inches from the upper edge, nails to be spaced not more than two (2) feet apart. All nails shall be covered by not less than two (2) plies of Tarred Felt.



Fifth—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be dry and free from dirt, and from one-fourth ($\frac{1}{4}$) inch to five-eighths ($\frac{5}{8}$) inch in size.

GENERAL. All tarred felt shall be laid without wrinkles or buckles. Tarred Felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet. Nailing of all felt shall be done with simplex flat head roofing nails or with seven-eighths ($\frac{7}{8}$) inch galvanized roof nails driven through flat tin discs.

For each one hundred (100) square feet of completed roofing surface there shall be used not less than one hundred and fifty (150) pounds of Coal Tar Pitch. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather.

MATERIALS. Materials shall be those as manufactured by Koppers Company, — Co., — Co., — Co., or approved equal applied according to the above specifications.

BOND. (If a 20-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer, and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 20-Year Maintenance Bond to the owner.

FLASHING. For 20-year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specifications No. 200 and No. 201.

4 PLY OVER WOOD DECKS

KOPPERS 15-YEAR BUILT UP ROOFING SPECIFICATION NO. 2

(Maximum Incline Two (2) Inches Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be clean, smooth and free from knot holes, large cracks and loose boards. The lumber shall be seasoned or treated. If the roof deck is inclined it shall be properly sloped to the outlets.

APPLICATION OF ROOFING MATERIAL. First—Lay one (1) thickness of sheathing paper, weighing not less than five (5) pounds per one hundred (100) square feet, lapping each sheet one (1) inch over the preceding sheet.

Second—Lay over the entire surface two (2) full thicknesses of Tarred Felt, lapping each sheet seventeen (17) inches over the preceding sheet. Nail as often as necessary to hold the sheets in place and until the remaining felt is laid.

Third—Apply over the entire surface a uniform coating of Coal Tar Pitch.

Fourth—Lay over the entire surface two (2) full thicknesses of Tarred Felt, lapping each sheet seventeen (17) inches over the preceding sheet and mopping with Coal Tar Pitch the full width of the seventeen (17) inch lap, so that in no place shall felt touch felt. Each sheet shall be nailed not less than two (2) inches from the upper edge, nails to be spaced not more than two (2) feet apart.

Fifth—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be dry and free from dirt, and from one-fourth ($\frac{1}{4}$) inch to five-eighths ($\frac{5}{8}$) inch in size.

GENERAL. All tarred felt shall be laid without wrinkles or buckles. Tarred Felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet. Nailing



of all felt shall be done with simplex flat head roofing nails or with seven-eighths ($\frac{7}{8}$) inch galvanized roof nails driven through flat tin discs.

For each one hundred (100) square feet of completed roofing surface there shall be used not less than one hundred and twenty-five (125) pounds of Coal Tar Pitch. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather.

MATERIALS. Materials shall be those as manufactured by Koppers Company, — Co., — Co., or approved equal applied according to the above specifications.

BOND. (If a 15-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the roofing manufacturer, and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 15-Year Surety Maintenance Bond to the owner.

FLASHING. For 15-Year Flashing refer to Specifications No. 106 and No. 105.

INSULATION. Refer to Specifications No. 200 and No. 201.

STEEP SLAG 5 PLY OVER WOOD DECKS KOPPERS 20-YEAR BUILT UP ROOFING SPECIFICATION NO. 3

Maximum Incline Six (6) Inches per Foot and Not Less Than Two (2) Inches Per Foot

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be of seasoned or treated lumber.

APPLICATION OF ROOFING MATERIAL. First—Lay one thickness of sheathing paper weighing not less than five (5) pounds per one hundred (100) square feet, lapping the sheet one inch. The sheathing paper shall be nailed sufficiently to hold it in place during application of the roofing.

Second—Lay over the entire surface five (5) full thicknesses of Tarred Felt at right angles to the incline of the roof, lapping each sheet twenty-six (26) inches over preceding sheet. Each sheet shall be nailed with one inch barbed roofing nails through flat tin discs, each eight (8) inches from the upper edge. Nails shall be spaced not more than one foot apart.

Third — Each sheet shall be mopped for a distance of twenty-four (24) inches with Steep Roofing Pitch. The felt shall be firmly embedded into the hot moppings as applied. Care shall be taken that the pitch moppings are even with lower edge of each overlying sheet, and that the finished felt surface is free of pitch drippage.

Fourth—Over the entire surface, spread with a mop a uniform coating of Steep Roofing Pitch into which, while hot, firmly embed not less than two hundred and fifty (250) pounds of slag for each one hundred (100) square feet of completed roofing. The slag shall be from one-fourth ($\frac{1}{4}$) inch to five-eighths ($\frac{5}{8}$) inch in size, shall be dry and free

from dirt. If roofing is applied during cool weather, or slag is damp, slag shall be heated and dried, so that it is warm when applied to the roof. The slag surfacing shall be firmly embedded into the surface coating. The finished surface shall be broomed clean of all loose slag.

GENERAL. All tarred felt shall be laid without wrinkles or buckles. Tarred felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

For each one hundred (100) square feet of completed roofing surface there shall be not less than eighty (80) pounds of pitch for felt moppings and not less than fifty (50) pounds nor more than sixty (60) pounds for embedding the slag. Pitch shall not be heated above three hundred and fifty (350°) degrees F. in cool or cold weather and not above three hundred and twenty-five (325°) degrees F. in hot weather.

Where steep roofing joins the flat roof, the roofing on the flat surface shall be carried up the inclined surface not less than twenty-four (24) inches before the steep roofing is applied. Slag stops at gutters shall extend one and one-half ($1\frac{1}{2}$) inches above the roof deck.

MATERIALS. Materials shall be those as manufactured by Koppers Company, — Co., — Co., — Co., or approved equal applied according to above specifications.

BOND. (If a 20-year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 20-year Surety Maintenance Bond to the owner.

FLASHING. For 20-year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specifications No. 200 and No. 201.



STEEP MINERAL SURFACED ROOFING OVER WOOD DECKS

KOPPERS 10-YEAR BUILT UP ROOFING SPECIFICATION NO. 4

(For Inclines Exceeding Four (4) Inches Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The lumber shall be seasoned or treated.

APPLICATION OF ROOFING MATERIAL. First—Lay over the entire surface two (2) full thicknesses of Tarred Felt, lapping each sheet seventeen (17) inches over the preceding sheet. The felt shall be laid across and not up and down the slope of the roof. Nail each sheet with one (1) inch barbed roofing nails through flat tin discs two (2) inches from the lower edge. Nails shall be spaced not more than eighteen (18) inches apart.

Second—Spread with a mop over the surface thus prepared a uniform coating of Steep Asphalt into which, while hot, embed a sheet of Mineral Surfaced Roofing, lapping each sheet the full nineteen (19) inch selvage. Sheets of mineral surfaced roofing shall be laid across and not up and down the slope of the roof, and shall be securely fastened in place along the selvage side with a double course of one (1) inch barbed roofing nails through flat tin discs, nails in each course to be spaced twelve (12) inches apart and courses staggered. Nailing course nearest the longitudinal center of the sheet shall be held back from the mineral surfacing two inches.

Third—Over the full width of the nineteen (19) inch selvage spread with a mop a uniform coating of Steep Asphalt into which, while hot, thoroughly embed the following sheet of Mineral Surfaced Roofing.

Fourth—There shall be a six (6) inch end lap between adjoining sheets. The underlying sheet of each end lap shall be nailed with eight (8) one (1) inch barbed roofing nails through flat tin discs. Nails to be spaced four (4) inches apart starting two (2) inches from the lower edge of each sheet. Coat the underside of six (6) inch end lap with Steep Asphalt and firmly embed the overlapping sheet.

All edges and end laps shall be carefully rubbed down.

GENERAL. Mineral surfaced roofing shall be cut in



strips not exceeding twenty (20) feet in length and shall be stacked flat.

All felts and mineral surfaced roofing shall be laid without wrinkles or buckles. Tarred felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

For each one hundred (100) square feet of completed roofing surface there shall be used not less than fifty (50) pounds of Steep Asphalt. Asphalt shall not be heated above three hundred, seventy-five (375°) degrees F.

Where the steep roof joins the flat roof, the roofing in the flat surface shall be carried up the inclined surface not less than

twenty-four (24) inches before the steep roofing is applied. Special Steep Bonded Roofing is to be applied in connection with Bonded Flat Roofing.

MATERIALS. Materials shall be those as manufactured by Koppers Company, — Co., — Co., — Co., or approved equal applied according to the above specifications.

BOND. (If a 10-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer, and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 10-Year Surety Maintenance Bond to the owner.

FLASHING. For 10-Year Flashing refer to Specifications No. 101 and No. 103.

4 PLY OVER POURED CONCRETE OR POURED GYPSUM

KOPPERS 20-YEAR BUILT UP ROOFING SPECIFICATION NO. 5

(Maximum Incline Two (2) Inches Per Foot)

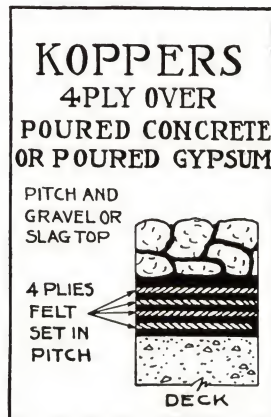
PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be smooth, dry, firm and clean, and if inclined shall be properly sloped to outlets.

Decks or inclines exceeding one (1) inch and less than two (2) inches to the foot shall permit nailing, or creosoted wood nailing strips must be set in the concrete flush with its surface, these strips to be spaced three (3) feet apart and placed up and down and not across the slope of the roof.

APPLICATION OF ROOFING MATERIAL. First—Apply a uniform coating of Coal Tar Pitch to the deck.

Second—Lay over the entire surface four (4) full thicknesses of Tarred Felt, lapping each sheet twenty-four and one-half (24½) inches over the preceding sheet, mopping with Coal Tar Pitch the full twenty-four and one-half (24½) inches on each sheet so that in no place shall felt touch felt.

When nailing is necessary nails should be placed not less than three (3) inches from the upper edge of each sheet and not more than three (3) feet apart. All nails shall be covered by not less than three (3) plies of felt.



All felts shall be laid without wrinkles or buckles.

Third—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be dry and free from dirt, and from one-fourth (¼) inch to five-eighths (⅝) inch in size.

GENERAL. For each one hundred (100) square feet of completed roofing there shall be used not less than two hundred (200) pounds of Coal Tar Pitch. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather. Tarred Felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

MATERIALS. Materials shall be those as manufactured by Koppers Company, — Co., — Co., — Co., or approved equal applied according to the above specifications.

BOND. (If a 20-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer, and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 20-Year Surety Maintenance Bond to the owner.

FLASHING. For 20-Year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specifications No. 203 and No. 202.

4 PLY OVER POURED CONCRETE OR POURED GYPSUM

KOPPERS 20-YEAR BUILT UP ROOFING SPECIFICATION NO. 6

(Maximum Incline One-Quarter (¼) Inch Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be smooth, dry firm and clean.

APPLICATION OF ROOFING MATERIAL. First—Apply a uniform coating of Coal Tar Pitch to the deck.

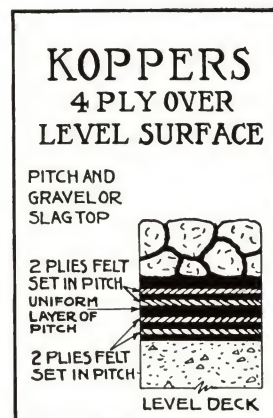
Second—Lay over the entire surface two (2) plies of Tarred Felt, lapping each sheet seventeen (17) inches over the preceding sheet, mopping with Coal Tar Pitch the full seventeen (17) inches on each sheet so that in no place shall felt touch felt.

Third—Apply a uniform coating of Coal Tar Pitch.

Fourth—Lay over the entire surface two (2) plies of Tarred Felt lapping each sheet seventeen (17) inches over the preceding sheet, mopping with Coal Tar Pitch the full seventeen (17) inches on each sheet so that in no place shall felt touch felt.

Fifth—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be dry and free from dirt and from one-fourth (¼) inch to five-eighths (⅝) inch in size.

GENERAL. All tarred felt shall be laid without wrinkles or buckles. Tarred felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet. For each one hundred (100) square feet of completed roofing there



shall be used not less than two hundred (200) pounds of Coal Tar Pitch. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather.

MATERIALS. Materials shall be those as manufactured by Koppers Company, — Co., — Co., — Co., or approved equal applied according to the above specifications.

BOND. (If a 20-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer, and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 20-Year Surety Maintenance Bond to the owner.

FLASHING. For 20-Year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specifications No. 203 and No. 202.

3 PLY OVER POURED CONCRETE OR POURED GYPSUM

KOPPERS 15-YEAR BUILT UP ROOFING SPECIFICATION NO. 7

(Maximum Incline Two (2) Inches Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be smooth, dry, firm and clean, and if inclined shall be properly sloped to outlets.

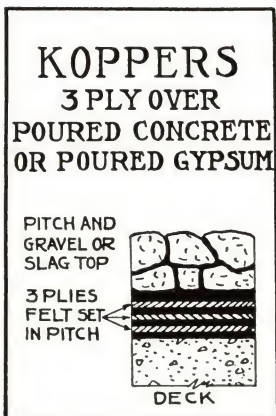
Decks or inclines exceeding one (1) inch and less than two (2) inches to the foot shall permit nailing or creosoted wood nailing strips must be set in the concrete flush with its surface, these strips to be spaced three (3) feet apart and shall be placed up and down and not across the slope of the roof.

APPLICATION OF ROOFING MATERIAL—First—Apply a uniform coating of Coal Tar Pitch to the deck.

Second—Lay over the entire surface three (3) full thicknesses of Tarred Felt, lapping each sheet twenty-two (22) inches over the preceding sheet, mopping with Coal Tar Pitch the full twenty-two (22) inches on each sheet so that in no place shall felt touch felt.

When nailing is necessary nails shall be placed not less than three (3) inches from the upper edge of each sheet and not less than three (3) feet apart. All nails shall be covered by not less than two (2) plies of felt.

All felts shall be laid without wrinkles or buckles.



Third—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be dry and free from dirt, and from one-fourth ($\frac{1}{4}$) inch to five-eighths ($\frac{5}{8}$) inch in size.

GENERAL. For each one hundred (100) square feet of completed roofing there shall be used not less than one hundred and seventy-five (175) pounds of Coal Tar Pitch. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather. Tarred Felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

MATERIALS. Materials shall be those as manufactured by Koppers Company, — Co., — Co., — Co., or approved equal according to the above specifications.

BOND. (If a 15-Year Guarantee Maintenance Bond is required) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer, and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 15-Year Surety Maintenance Bond to the owner.

FLASHING. For 15-Year Flashing refer to Specifications No. 106 and No. 105.

INSULATION. Refer to Specification No. 203.

STEEP SLAG 4 PLY OVER POURED CONCRETE OR POURED GYPSUM

KOPPERS 20-YEAR BUILT UP ROOFING SPECIFICATION NO. 8

(Maximum Incline Six (6) Inches Per Foot and Not Less Than Two (2) Inches Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be smooth, dry, firm, clean and should be suitable for nailing. If the Poured Concrete or Poured Gypsum deck does not permit nailing, creosoted wooden nailing strips shall be set in the concrete flush with its surface, these strips to be spaced three (3) feet apart and placed up and down and not across the slope of the roof.

APPLICATION OF ROOFING MATERIAL. First—Apply a uniform coating of Steep Roofing Pitch to the deck.

Second—Lay over the entire surface four full thicknesses of Tarred Felt at right angles to the incline of the roof, lapping each sheet twenty-four and one-half ($24\frac{1}{2}$) inches over preceding sheet. Each sheet shall be nailed with one inch barbed roofing nails through flat tin discs, eight inches from the upper edge, and nails shall be spaced not more than one foot apart. Where nailing strips are used, the felt shall be nailed with two nails through flat tin discs (at each nailing strip) placed six (6) inches and eight (8) inches respectively from the upper edge of each sheet.

Third—Each sheet shall be mopped the full distance of the twenty-four and one-half ($24\frac{1}{2}$) inch lap with Steep Roofing Pitch. The felt shall be firmly embedded into the hot moppings as applied. Care shall be taken that pitch moppings are even with lower edge of each overlying sheet and that the finished felt surface is free from pitch drippage.

Fourth—Over the entire surface spread with a mop a uniform coating of Steep Roofing Pitch, into which, while hot, firmly embed not less than two hundred and fifty (250) pounds of slag for each one hundred (100) square feet of completed roofing. The slag shall be from one-fourth ($\frac{1}{4}$) to five-eighths ($\frac{5}{8}$) inches in size, shall be dry and free from dirt. If roofing is applied during cool weather, or slag is damp, slag shall be heated and dried, so that it is warm when applied to the roof. The slag surfacing shall be firmly embedded in the surface coating. The finished surface shall be broomed clean of all loose slag.

GENERAL. All tarred felt shall be laid without wrinkles or buckles. Tarred felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet. For each one hundred (100) square feet of completed roofing surface there shall be used not less than one hundred (100)

pounds of pitch for felt and deck moppings and not less than fifty (50) pounds nor more than sixty (60) pounds for embedding the slag. Pitch shall not be heated above three hundred and fifty (350°) degrees F. in cool or cold weather and not above three hundred and twenty-five (325°) degrees F. in hot weather.

Where steep roofing joins the flat roof, the roofing on the flat surface shall be carried up the inclined surface not less than twenty-four (24) inches before the steep roofing is applied.

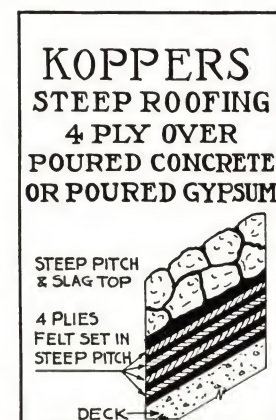
Slag stops at gutters shall extend one and one-half ($1\frac{1}{2}$) inches above roof deck.

MATERIALS. Materials shall be those as manufactured by Koppers Company, — Co., — Co., — Co., or approved equal applied according to the above specifications.

BOND. (If a 20-year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 20-Year Surety Maintenance Bond to the Owner.

FLASHING. For 20-year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specifications No. 203 and No. 202.



STEEP MINERAL SURFACED ROOFING OVER POURED CONCRETE OR POURED GYPSUM DECK

KOPPERS 10-YEAR BUILT UP ROOFING SPECIFICATION NO. 9

(For Inclines Exceeding Four (4) Inches Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be smooth, dry, firm and suitable for nailing. If the Poured Concrete or Poured Gypsum deck does not permit nailing, creosoted nailing strips shall be set flush with the deck, such strips to be spaced three (3) feet apart and placed up and down the slope of the roof.

APPLICATION OF ROOFING MATERIAL. First—Apply over the deck surface a priming coat of Asphalt Primer which shall be allowed to dry for at least one (1) hour.

Second—Coat the entire surface of the deck with a uniform mopping of Steep Asphalt into which, while hot, embed one (1) ply of Tarred Felt, lapping each sheet six (6) inches over the preceding sheet. The felt shall be laid across and not up and down the slope of the roof. The six (6) inch lap shall be thoroughly mopped with Steep Asphalt so that in no place shall felt touch felt. Nail each sheet two (2) inches from the lower edge with barbed roofing nails driven through flat tin discs and spaced not more than eighteen (18) inches on center.

When nailing strips are used the felt shall be nailed with three (3) nails through flat tin discs, eight (8) inches apart and starting two (2) inches from the lower edge of each sheet at each nailing strip.

Third—Spread with a mop over the surface thus prepared a uniform coating of Steep Asphalt, into which, while hot, embed a sheet of Mineral Surfaced Roofing, lapping each sheet the full nineteen (19) inch selvage. Sheets of Mineral Surfaced Roofing shall be laid across and not up and down the slope of the roof and shall be securely fastened in place along the selvage side with a double course of one (1) inch barbed roofing nails through flat tin discs, nails in each course to be spaced twelve (12) inches apart and courses staggered. Nailing occurring nearest the longitudinal cen-

ter of each sheet shall be held back from the mineral surfacing two (2) inches. When nailing strips are used the sheets shall be nailed along the selvage side with three (3) nails driven through flat tin discs, spaced five (5) inches apart at each nailing strip. All nails to be held back two (2) inches from the mineral surfacing.

Fourth—Over the full width of the selvage mop a uniform coating of Steep Asphalt into which, while hot, embed the following sheet of Mineral Surfaced Roofing.

There shall be a six (6) inch end lap between adjoining sheets. The underlying sheet of each end lap shall be nailed with eight (8) one (1) inch barbed roofing nails through flat tin discs. Nails to be spaced four (4) inches apart starting two (2) inches from the lower edge of each sheet. Coat the underside of the six (6) inch end lap with Steep Asphalt and firmly embed the overlapping sheet.

All edges and end laps shall be carefully rubbed down.

Mineral Surfaced Roofing shall be cut in strips not exceeding twenty (20) feet in length and shall be stacked flat for sufficient time to permit these strips to become perfectly flat before starting application.

GENERAL. All felts and mineral surfaced roofing shall be laid without wrinkles or buckles. All tarred felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

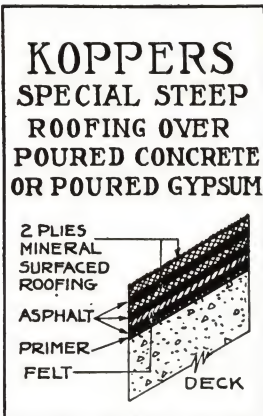
For each one hundred (100) square feet of completed roofing surface there shall be used not less than one hundred (100) pounds of Steep Asphalt. Asphalt shall not be heated above 375 degrees Fahrenheit.

Where steep roof joins flat roof, the roofing in the flat surface shall be carried up the inclined surface not less than twenty-four (24) inches before steep roofing is applied. Special Steep Bonded Roofing is to be applied in connection with Bonded Flat Roofing.

MATERIALS. Materials shall be those as manufactured by Koppers Company, — Co., — Co., — Co., or approved equal applied according to the above specifications.

BOND. If bond is required, insert same paragraph as under "Bond" in Specification No. 4.

FLASHING. For 10-Year Flashing refer to Specifications No. 101 and No. 103.



OVER PRECAST CONCRETE SLAB

4 PLY OVER PRECAST CONCRETE SLAB

KOPPERS 20-YEAR BUILT UP ROOFING SPECIFICATION NO. 10

(Maximum Incline One (1) Inch Per Foot)

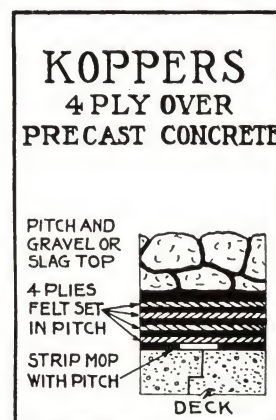
PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be smooth, firm, dry and clean. If roof deck is inclined, it shall be properly sloped to the outlets. The incline shall not exceed one (1) inch to the foot.

APPLICATION OF ROOFING MATERIAL. First—Each slab shall be spot or strip mopped with Coal Tar Pitch. The pitch moppings shall be held back four (4) inches from edge of each joint.

Second—Lay over the entire surface four (4) full thicknesses of Tarred Felt, lapping each sheet twenty-four and one-half (24½) inches over preceding sheet, mopping with Coal Tar Pitch the full twenty-four and one-half (24½) inches on each sheet. In no place shall felt touch felt. Tarred Felt shall be laid without wrinkles or buckles.

Third—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be dry and free from dirt, and from one-fourth (¼) inch to five-eighths (⅝) inch in size.

GENERAL. For each one hundred (100) square feet of completed roofing surface there shall be used not less than two hundred (200) pounds of Coal Tar Pitch. Pitch shall not



be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather.

Tarred felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

MATERIALS. Materials shall be those as manufactured by Koppers Company, — Co., — Co., — Co., or approved equal applied according to the above specifications.

BOND. If Bond is required, insert same paragraph as under "Bond" in Specification No. 12.

FLASHING. For 20-Year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specifications No. 203 and No. 202.

3 PLY OVER PRECAST CONCRETE SLAB KOPPERS 15-YEAR BUILT UP ROOFING SPECIFICATION NO. 11

(Maximum Incline One (1) Inch Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be smooth, firm, dry and clean. If the roof deck is inclined it shall be properly sloped to the outlets. In such cases the incline shall not exceed one (1) inch to the foot.

APPLICATION OF ROOFING MATERIAL. First—Each slab shall be spot or strip mopped with Coal Tar Pitch; the moppings shall be held back four (4) inches from the edge of each joint.

Second—Lay over the entire surface three (3) full thicknesses of Tarred Felt lapping each sheet, twenty-two (22) inches over the preceding sheet, mopping with Coal Tar Pitch the full twenty-two (22) inches so that in no place shall felt touch felt. All felts shall be laid without wrinkles or buckles.

Third—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each hun-

dred (100) square feet. The gravel or slag shall be dry and free from dirt and from one-fourth ($\frac{1}{4}$) inch to five-eighths ($\frac{5}{8}$) inch in size.

GENERAL. For each one hundred (100) square feet of completed roofing surface there shall be used not less than one hundred and seventy-five (175) pounds of Coal Tar Pitch. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather. Tarred Felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

MATERIALS. Materials shall be those as manufactured by Koppers Company, — Co., — Co., — Co., or approved equal applied according to the above specifications.

BOND. (If a KOPPERS 15-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer, and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 15-Year Maintenance Bond to the owner.

FLASHING. For 15-Year Flashing refer to Specifications No. 106 and No. 105.

INSULATION. Refer to Specifications No. 203 and No. 202.



OVER PRECAST GYPSUM

5 PLY OVER PRECAST GYPSUM KOPPERS 20-YEAR BUILT UP ROOFING SPECIFICATION NO. 12

(Maximum Incline Two (2) Inches Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be smooth, dry, firm and clean. If the roof deck is inclined, it shall be properly sloped to the outlets. All joints between the precast gypsum slabs shall be properly pointed.

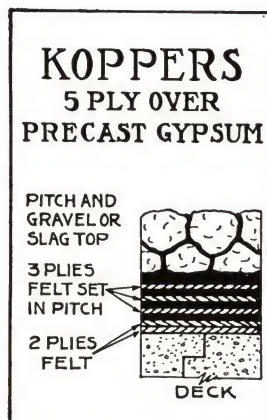
APPLICATION OF ROOFING MATERIAL. First—Two (2) full thicknesses of Tarred Felt shall be laid over the entire surface, lapping each sheet seventeen (17) inches over the preceding sheet. Nail as often as may be necessary to hold the sheets in place until the remaining felt is laid.

Second—Apply a uniform coating of Coal Tar Pitch.

Third—Lay over the entire surface three (3) full thicknesses of Tarred Felt, lapping each sheet twenty-two (22) inches over the preceding sheet, and mopping with Coal Tar Pitch the full width of the twenty-two (22) inch lap, so that in no place shall felt touch felt. Nail six (6) inches from the upper edge of each sheet and not more than two (2) feet apart. Nails shall not exceed seven-eighths ($\frac{7}{8}$) inch in length and shall be driven through flat tin discs which shall be not less than one (1) inch in diameter.

Fourth—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be dry and free from dirt and from one-fourth ($\frac{1}{4}$) to five-eighths ($\frac{5}{8}$) inch in size.

GENERAL. All tarred felts shall be laid without wrinkles or buckles. Tarred Felt shall weigh not less than fifteen (15)



pounds per one hundred (100) square feet. For each one hundred (100) square feet of completed roofing surface there shall be used not less than one hundred and fifty (150) pounds of Coal Tar Pitch. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather.

MATERIALS. Materials shall be those as manufactured by Koppers Company, — Co., — Co., — Co., or approved equal applied according to the above specifications

BOND. (If a KOPPERS 20-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer, and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 20-Year Surety Maintenance Bond to the owner.

FLASHING. For 20-Year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specification No. 201.

4 PLY OVER PRECAST GYPSUM KOPPERS 15-YEAR BUILT UP ROOFING SPECIFICATION NO. 13

(Maximum Incline Two (2) Inches Per Foot)

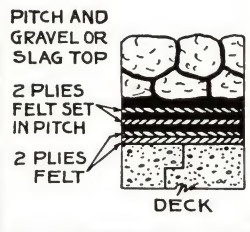
PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be smooth, dry, firm and clean. If the roof deck is inclined it shall be properly sloped to the outlets. All joints between the precast gypsum slabs shall be properly pointed.

APPLICATION OF ROOFING MATERIAL. First—Two (2) full thicknesses of Tarred Felt shall be laid over the entire surface, lapping each sheet seventeen (17) inches over the preceding sheet and nailing as often as may be necessary to hold the sheets until the remaining felt is laid.

Second — Apply a uniform coating of Coal Tar Pitch.

Third—Lay over the entire surface two (2) full thicknesses of Tarred Felt, lapping each sheet seventeen (17) inches over the preceding sheet and mopping with Coal Tar Pitch the full width of the seventeen (17) inch lap so that in no place shall felt touch felt. Nail six (6) inches from the upper edge of sheet and not more than two (2) feet apart. Nails shall not exceed seven-eighths ($\frac{7}{8}$) inch in length and shall be driven through flat tin discs which shall not be less than one (1) inch in diameter.

KOPPERS 4 PLY OVER PRECAST GYPSUM



Fourth—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be dry and free from dirt and from one-fourth ($\frac{1}{4}$) inch to five-eighths ($\frac{5}{8}$) inch in size.

GENERAL. All tarred felt shall be laid without wrinkles or buckles. Tarred felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet. For each one hundred (100) square feet of completed roofing surface there shall be used not less than one hundred and twenty-five (125) pounds of Coal Tar Pitch. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather.

MATERIALS. Materials shall be those as manufactured by Koppers Company, — Co., — Co., — Co., or approved equal applied according to the above specifications.

BOND. (If a 15-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer, and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 15-Year Surety Maintenance Bond to the owner.

FLASHING. For 15-Year Flashing refer to Specifications No. 106 and No. 105.

INSULATION. Refer to Specification No. 201.

STEEP SLAG 5 PLY OVER PRECAST GYPSUM KOPPERS 20-YEAR BUILT UP ROOFING SPECIFICATION NO. 14

(Maximum Incline Six (6) Inches Per Foot and Not Less Than Two (2) inches Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be smooth, dry, firm and clean. All joints between the precast gypsum slabs shall be properly pointed.

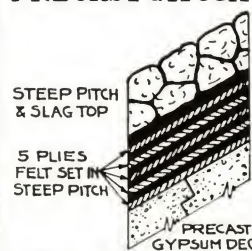
APPLICATION OF ROOFING MATERIAL. First—Lay over the entire surface five (5) full thicknesses of Tarred Felt at right angles to the incline of the roof, lapping each sheet twenty-six (26) inches over preceding sheet. Each sheet shall be nailed with one and one-half inch barbed roofing nails, through flat tin discs, eight (8) inches from the upper edge. Nails to be spaced not more than one (1) foot apart.

Second—Each sheet shall be mopped for a distance of twenty-four (24) inches with Steep Roofing Pitch. The felt shall be firmly embedded into the hot moppings as applied. Care shall be taken that pitch moppings are even with lower edge of each overlying sheet, and that the finished felt surface shall be free of drippage.

Third—Over the entire surface spread with a mop a uniform coating of Steep Roofing Pitch, into which, while hot, firmly embed not less than two hundred fifty (250) pounds of slag for each one hundred (100) square feet of completed roofing. The slag shall be from one-fourth ($\frac{1}{4}$) to five-eighths ($\frac{5}{8}$) inch in size, shall be dry and free from dirt. If roofing is applied during cool weather or slag is damp, slag shall be heated and dried, so that it is warm when applied to the roof. The slag surfacing shall be firmly embedded into the surface coating. The finished surface shall be broomed clean of all loose slag.

GENERAL. All tarred felt shall be laid without wrinkles or buckles. Tarred felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet. For each one hundred (100) square feet of completed roofing surface there shall be used not less than eighty (80) pounds of pitch for

KOPPERS STEEP ROOFING 5 PLY OVER PRECAST GYPSUM



felt moppings and not less than fifty (50) pounds nor more than sixty (60) pounds for embedding the slag. Pitch shall not be heated above three hundred and fifty (350°) degrees F. in cool or cold weather and not above three hundred and twenty-five (325°) degrees F. in hot weather.

Where steep roofing joins the flat roof, the roofing on the flat surface shall be carried up the inclined surface not less than twenty-four (24) inches before the steep roofing is applied.

Slag stops at gutters shall extend one and one-half ($1\frac{1}{2}$) inches above the roof deck.

MATERIALS. Materials shall be those as manufactured by Koppers Company, — Co., — Co., — Co., or approved equal applied according to the above specifications.

BOND. (If a 20-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 20-Year Surety Maintenance Bond to the owner.

FLASHING. For 20-year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specification No. 201.

4 PLY OVER BOOK TILE**KOPPERS 20-YEAR BUILT UP ROOFING SPECIFICATION NO. 15**

(Maximum Incline One (1) Inch Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The book tile shall be surfaced with not less than one (1) inch of Portland Cement Mortar or Gypsum, finished smooth, firm, dry and clean and properly bonded to the underlying

tile. If the roof deck is inclined, it shall be properly sloped to the outlets.

APPLICATION OF ROOFING MATERIALS. Roofing shall be applied according to Koppers Roofing Specification No. 5.

3 PLY OVER BOOK TILE**KOPPERS 15-YEAR BUILT UP ROOFING SPECIFICATION NO. 16**

(Maximum Incline One (1) Inch Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The book tile shall be surfaced with not less than one (1) inch of Portland Cement Mortar or Gypsum, finished smooth, firm, dry and clean and properly bonded to the underlying

tile. If the roof deck is inclined, it shall be properly sloped to the outlets.

APPLICATION OF ROOFING MATERIALS. Roofing shall be applied according to Koppers Roofing Specification No. 7.

OVER STEEL DECK**4 PLY OVER STEEL DECK WITH INSULATION****KOPPERS 20-YEAR BUILT UP ROOFING SPECIFICATION NO. 17**

(Maximum Incline One (1) Inch Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The Steel Deck shall be clean, smooth and dry, and shall be properly anchored to the steel purlins, and all joints properly lapped. The deck shall be primed with Asphalt Primer before application of the insulation, unless previously shop-coated. If the deck is inclined it shall be properly graded to the outlets.

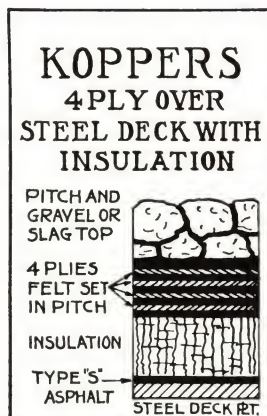
APPLICATION OF MATERIAL. First—Mop the steel deck with Steep Asphalt into which, while hot, embed the insulation pressing firmly into the asphalt. The insulation must be thoroughly dry and of approved type and must be able to retain nails. When more than one (1) layer of insulation is used the top surface of each layer shall be coated with Coal Tar Pitch into which, while hot, embed the succeeding layer. (This is optional because layers may be laid dry if desired.) All joints shall be broken between the layers of insulation. All layers of insulation shall be parallel to preceding layers. Edges shall be brought closely together and shall not be forced into place. No more insulation shall be installed at any one time than can be protected by pitch and felt in case of sudden weather changes. Cut-offs consisting of two (2) plies of Tarred Felt and moppings of Steep Asphalt extending on to the deck at least six (6) inches and four (4) inches on top of the insulation shall be applied at the end of each day's work over exposed edges of insulation.

All edges of insulation adjoining parapet walls, cants, eaves, vertical surfaces, etc., shall be sealed by applying two (2) plies of Tarred Felt and moppings of Asphalt.

Second—Apply a uniform coating of Coal Tar Pitch over the insulation.

Third—Lay over the entire surface four (4) full thicknesses of Tarred Felt, lapping each sheet twenty-four and one-half ($24\frac{1}{2}$) inches over the preceding sheet, mopping with Coal Tar Pitch the full twenty-four and one-half ($24\frac{1}{2}$) inches on each sheet so that in no place shall felt touch felt. All tarred felts shall be laid without wrinkles or buckles.

Fourth—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel, or three hundred (300) pounds of slag, for each one hundred (100) square feet. The



gravel or slag shall be dry and free from dirt, and from one-fourth ($\frac{1}{4}$) inch to five-eighths ($\frac{5}{8}$) inch in size.

GENERAL. For each one hundred (100) square feet of completed roofing there shall be used not less than two hundred (200) pounds of Coal Tar Pitch and not less than thirty-five (35) pounds of Coal Tar Pitch for moppings between each layer of insulation. Approximately thirty-five (35) pounds of Steep Asphalt shall be required for the deck mopping. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and

not above three hundred (300°) degrees F. in hot weather. Asphalt shall not be heated above three hundred and seventy-five (375°) degrees Fahrenheit.

Tarred felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

Koppers Company will not be responsible for any damage to or below the built-up roofing caused by or as the result of the use of insulation.

MATERIALS. Materials shall be those as manufactured by Koppers Company, — Co., — Co., — Co., or approved equal applied according to the above specifications.

BOND. (If a 20-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 20-Year Surety Maintenance Bond to the owner.

FLASHING. For 20-Year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specification No. 204.

3 PLY OVER STEEL DECK WITH INSULATION

KOPPERS 15-YEAR BUILT UP ROOFING SPECIFICATION NO. 18

(Maximum Incline One (1) Inch Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The Steel Deck shall be clean, smooth and dry, and shall be properly anchored to the steel purlins, and all joints properly lapped. The deck shall be primed with Asphalt Primer before application of the insulation, unless previously shop-coated. If the deck is inclined it shall be properly graded to the outlets.

APPLICATION OF ROOFING MATERIAL. First—

Mop the steel deck with steep Asphalt into which, while hot, embed the insulation, pressing firmly into the asphalt. The insulation must be thoroughly dry and of approved type and must be able to retain nails. When more than one (1) layer of insulation is used the top surface of each layer shall be coated with Coal Tar Pitch into which, while hot, embed the succeeding layer. (This is optional because all layers may be laid dry if desired.) All joints shall be broken between layers of insulation. All layers of insulation shall be parallel to preceding layers. Edges shall be brought closely together and shall not be forced into place. No more insulation shall be installed at any one time than can be protected by pitch and felt in case of sudden weather changes. Cutoffs consisting of two (2) plies of Tarred Felt and moppings of Steep Asphalt extending on to the deck at least six (6) inches and four (4) inches on top of the insulation shall be applied at the end of each day's work over exposed edges of insulation.

All edges of insulation adjoining parapet walls, cants, eaves, vertical surfaces, etc., shall be sealed by applying two (2) plies of Tarred Felt and moppings of Asphalt.

Second—Apply a uniform coating of Coal Tar Pitch over the insulation.



Third—Lay over the entire surface three (3) full thicknesses of Tarred Felt, lapping each sheet twenty-two (22) inches over the preceding sheet, mopping with Coal Tar Pitch the full twenty-two (22) inches on each sheet so that in no place shall felt touch felt. All tarred felts shall be laid without wrinkles or buckles.

Fourth—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed not less than four hundred (400) pounds of gravel or three hundred (300) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be dry and free from dirt, and from one-fourth ($\frac{1}{4}$) inch to five-eighths ($\frac{5}{8}$) inch in size.

GENERAL. For each one hundred (100) square feet of completed roofing there shall be used not less than one hundred and seventy-five (175) pounds of Coal Tar Pitch and not less than thirty-five (35) pounds of Coal Tar Pitch for moppings between each layer of insulation. Approximately thirty-five (35) pounds of Steep Asphalt will be required for deck mopping. Asphalt shall not be heated above three hundred and seventy-five (375°) degrees Fahrenheit. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather.

Tarred Felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

Koppers Company will not be responsible for any damage to or below the built-up roofing caused by or as the result of the use of insulation.

MATERIALS. Materials shall be those as manufactured by Koppers Company, — Co., — Co., — Co., or approved equal applied according to the above specifications.

BOND. (If a 15-Year Guarantee Maintenance Bond is required) The roofing must be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer, and subject to their inspection and approval and upon completion of work furnish the roofing manufacturer's 15-Year Surety Maintenance Bond to the owner.

FLASHING.—For 15-Year Flashing refer to Specifications No. 106 and No. 105.

INSULATION. Refer to Specification No. 204.

STEEP 4 PLY SLAG OVER STEEL DECK WITH INSULATION

KOPPERS 20-YEAR ROOFING SPECIFICATION NO. 19

(Maximum Incline Six (6) Inches Per Foot and Not Less Than One (1) Inch Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The steel deck shall be clean, smooth and dry, and shall be properly anchored to the steel purlins, and all joints properly lapped. The deck shall be primed with Asphalt Primer before application of the insulation, unless previously shop-coated. The deck shall be properly graded to the outlets.

APPLICATION OF INSULATION. First—Mop the steel deck with Steep Asphalt into which, while hot, embed the insulation pressing firmly into the asphalt. The insulation must be thoroughly dry and of approved type and must be able to retain nails. Insulation shall be securely fastened to the deck by means of approved screws, expanding nails or cleats which shall be placed at each corner and in the center of each sheet of insulation. When more than one (1) layer of insulation is applied fasteners shall be driven after the top layer has been applied. The top surface of each layer of insulation shall be coated with Steep Pitch into which embed the succeeding layer. (This is optional because insulation sheets may be laid dry if desired.) All joints shall be broken between layers of insulation. All layers of insulation shall be parallel to succeeding layers.



Edges shall be brought closely together and shall not be forced into place.

No more insulation shall be installed at any one time than can be protected by pitch and felt in case of sudden weather changes.

Cutoffs consisting of two (2) plies of Tarred Felt and moppings of Steep Asphalt extending on to the deck at least six (6) inches and four (4) inches on top of the insulation shall be applied at the end of each day's work over exposed edges of insulation.

All edges of insulation adjoining parapet walls, cants, eaves, vertical surfaces, etc., shall be sealed by applying two (2) plies of Tarred Felt and moppings of Asphalt.

(Continued next page)

APPLICATION OF ROOFING MATERIALS. First — Apply a uniform coating of steep roofing pitch to the insulation.

Second—Lay over the entire surface four (4) full thicknesses of Tarred Felt at right angles to the incline of the roof, lapping each sheet twenty-four and one-half (24½) inches over the preceding sheet. Nail each sheet with soft nose nails of sufficient length to completely penetrate the insulation but which will not puncture the steel deck. Nails to be through flat tin discs eight (8) inches from the upper edge and to be spaced not more than one (1) foot apart.

Third—Each sheet shall be mopped the full distance of the twenty-four and one-half (24½) inch lap with steep roofing pitch. The felt shall be firmly embedded into the hot moppings as applied. Care shall be taken that the pitch moppings are even with the lower edge of each overlying sheet and that the finished felt surface is free from pitch drip page.

Fourth—Over the entire surface spread with a mop a uniform coating of steep roofing pitch into which, while hot, firmly embed not less than two hundred and fifty (250) pounds of slag for each one hundred (100) square feet of completed roofing. The slag shall be from one-fourth (¼) to five-eighths (⅝) inch in size and shall be dry and free from dirt. If roofing is applied during cool weather or slag is damp, slag shall be heated and dried so that it is warm when applied to the roof. The slag surfacing shall be firmly embedded into the surface coating. The finished surface shall be broomed clean of all loose slag.

GENERAL. All tarred felt shall be laid without wrinkles or buckles. Tarred felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

There shall be applied not less than thirty-five (35) pounds of Steep Asphalt for deck moppings and not less than thirty-five (35) pounds of Steep Roofing Pitch for moppings between each layer of insulation. For each one hundred (100) square feet of completed roofing surface above insulation there shall be used not less than one hundred (100) pounds of steep roofing pitch for felt and insulation moppings, and not less than fifty (50) pounds nor more than sixty (60) pounds for embedding the slag. Pitch shall not be heated above three hundred and fifty (350°) degrees F. in cool or cold weather and not above three hundred and twenty-five (325°) degrees F. in hot weather.

Where steep roofing joins the flat roof, the roofing on the flat surface shall be carried up the inclined surface not more than twenty-four (24) inches before the steep roofing is applied.

Slag stops at gutters shall extend one and one-half (1½) inches above roof deck.

MATERIALS. Materials shall be those as manufactured by Koppers Company, — Co., — Co., — Co., or approved equal applied according to the above specifications.

BOND. (If a 20-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 20-Year Surety Maintenance Bond to the Owner.

FLASHING. For 20-Year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specification No. 204.

UNDER PROMENADE TILE

5 PLY OVER POURED CONCRETE UNDER PROMENADE TILE

KOPPERS PROMENADE TILE BUILT UP ROOFING SPECIFICATION NO. 20

(Maximum Incline One (1) Inch Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The deck shall be concrete and shall be smooth, dry, firm, clean and properly sloped to the outlets.

APPLICATION OF ROOFING MATERIAL. First—Apply a uniform coating of Coal Tar Pitch.

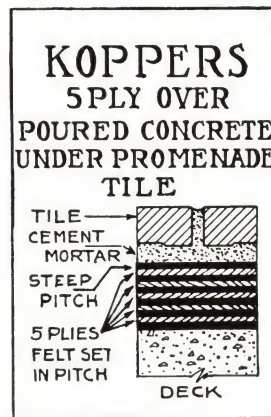
Second—Lay over the entire surface two (2) full thicknesses of Tarred Felt, lapping each sheet seventeen (17) inches over the preceding sheet, mopping with Coal Tar Pitch the full seventeen (17) inches on each sheet so that in no place shall felt touch felt.

Third—Apply a uniform coating of Coal Tar Pitch.

Fourth—Lay over the entire surface two (2) full thicknesses of Tarred Felt, lapping each sheet seventeen (17) inches over the preceding sheet, mopping with Coal Tar Pitch the full seventeen (17) inches on each sheet so that in no place shall felt touch felt.

Fifth—Before laying the tile, the surface of the roofing shall be thoroughly cleaned and the roofing mopped with Coal Tar Pitch into which, while hot, embed one (1) layer of Tarred Felt lapping each sheet two (2) inches over the preceding sheet. Over this surfacing and immediately preceding the laying of the tile spread a heavy uniform coating of Steep Roofing Pitch. Only part of the roof surface shall be covered with the last ply of felt and mopping of pitch at a time, the tile then being laid over that portion at once.

Sixth—The vitrified clay tile shall be set in not less than three-fourths (¾) inch of Portland Cement Mortar (1 to 3 mix). The joints shall be grouted full with Portland Cement Mortar (1 to 2 mix). The tile shall be laid to show three-sixteenths (3/16) inch to one-fourth (¼) inch joints. Expansion joints three-fourths (¾) inch wide filled with plastic mixture, which must be approved by the architect, shall be provided between the tile and all flashings. Either metal or mastic expansion joints shall be provided throughout the roof surface as may be necessary. Expansion joints shall extend through to the roofing and shall be spaced not more than twenty (20) feet apart in any direction. They shall also be installed at all walls, skylights, curbs, etc.



GENERAL. All tarred felts shall be laid without wrinkles or buckles. Tarred Felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet. For each one hundred (100) square feet of completed roofing surface there should be used not less than two hundred (200) pounds of Coal Tar Pitch. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather.

All end laps between sections of tarred felt shall be staggered at least six (6) inches.

Notice — The Koppers Company will not be responsible or liable for leaks due to the installation, contraction or expansion of Promenade Tile and will not be responsible for the taking up and replacing of tile in order to locate leaks through the roofing.

MATERIALS. Materials shall be those as manufactured by Koppers Company, — Co., — Co., — Co., or approved equal applied according to the above specifications.

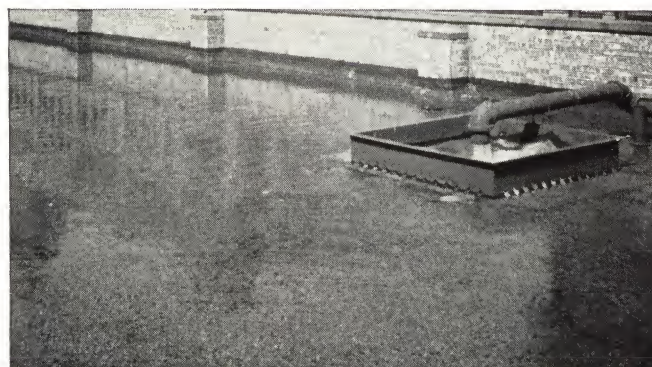
BOND. (If a 20-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 20-Year Surety Maintenance Bond to the owner.

FLASHING. For 20-Year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specifications No. 203 and No. 202.

KOPPERS SPRAY POND AND WATER-COOLED ROOFING SPECIFICATIONS

Air conditioning is increasing and will greatly increase the amount of water used in many buildings. In some instances it is economical to spray the water onto the roofing, thus cooling it for re-use in the air conditioning equipment. The use of sprays is not always required and the water may flow onto the roofing at one point as shown in the photograph on this page. Maintaining two inches of water on the roofing also cools the building, because 1000 BTU are dissipated by the evaporation of each pound of water. Cooling the roof by water cuts down the refrigeration costs in an air conditioned building and it makes the upper floors of any building more habitable during the summer.



Water from Air-Conditioning System Flowing on to Roof

SPRAY POND OR WATER-COOLED ROOF OVER WOOD DECK OR PRECAST GYPSUM SLAB

KOPPERS 20-YEAR BUILT UP ROOFING SPECIFICATION NO. 21

(Preferably Dead Level. Maximum Incline Two (2) Inches Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be clean, smooth and free from knot holes, large cracks and loose boards. The lumber shall be seasoned or treated. If the roof deck is inclined it shall be properly sloped to the outlets.

APPLICATION OF ROOFING MATERIAL. First—Lay one (1) thickness of sheathing paper, weighing not less than five (5) pounds per one hundred (100) square feet, lapping each sheet one (1) inch over the preceding sheet. If Precast Gypsum Slab is used, sheathing paper may be omitted.

Second—Lay over the entire surface two (2) full thicknesses of Tarred Felt, lapping each sheet seventeen (17) inches over the preceding sheet. Nail as often as necessary to hold the sheets in place and until the remaining felt is laid.

Third—Apply over the entire surface a uniform coating of Coal Tar Pitch.

Fourth—Lay over the entire surface three (3) full thicknesses of Tarred Felt, lapping each sheet twenty-two (22) inches, so that in no place shall felt touch felt. Each sheet shall be nailed not less than two (2) inches from the upper edge, nails to be spaced not more than two (2) feet apart.

Fifth—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed approximately two hundred (200) pounds of gravel or one hundred and fifty (150) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-fourth ($\frac{1}{4}$) inch to five-eighths ($\frac{5}{8}$) inch in size, and shall be dry and free from dirt.

Sixth—All loose slag and gravel shall be swept from the surface and a second uniform pouring of Coal Tar Pitch

shall be poured over the slag or gravel into which, while hot, there shall be applied a second layer of two hundred (200) pounds of gravel or one hundred and fifty (150) pounds of slag. The entire surface shall then be thoroughly broomed free from all loose gravel or slag. It is advisable to roll, with a light roller, the finished surface.

GENERAL. All Tarred Felt shall be laid without wrinkles or buckles. Tarred Felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

All felts shall be turned up not less than four (4) inches at vertical surfaces.

There shall be used not less than two hundred and twenty-five (225) pounds of Coal Tar Pitch for each one hundred (100) square feet of completed roofing surface. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather.

At points where water pressure from the spray is excessive, the roof surface shall be protected with creosoted board platforms or other suitable construction to break the force of the water. These platforms shall be laid on top of the roof surface and not fastened to the deck.

MATERIALS. Materials shall be those as manufactured by Koppers Company, — Co., — Co., — Co., or approved equal applied according to the above specifications.

BOND. (If a 20-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 20-Year Surety Maintenance Bond to the owner.

FLASHING. For 20-Year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specifications No. 200 and No. 201.



SPRAY POND OR WATER-COOLED ROOF OVER WOOD DECK OR PRECAST GYPSUM SLAB

KOPPERS 15-YEAR BUILT UP ROOFING SPECIFICATION NO. 22

(Preferably Dead Level. Maximum Incline Two (2) Inches Per Foot)

PREPARATION OF SURFACE TO BE ROOFED.—The roof deck shall be clean, smooth and free from knot holes, large cracks and loose boards. The lumber shall be seasoned or treated. If the roof deck is inclined it shall be properly sloped to the outlets.

APPLICATION OF ROOFING MATERIAL. First—Lay one (1) thickness of sheathing paper, weighing not less than five (5) pounds per one hundred (100) square feet, lapping each sheet one (1) inch over the preceding sheet. If Precast Gypsum Slab is used, sheathing paper may be omitted.

Second—Lay over the entire surface two (2) full thicknesses of Tarred Felt, lapping each sheet seventeen (17) inches over the preceding sheet. Nail as often as necessary to hold the sheets in place and until the remaining felt is laid.

Third—Apply over the entire surface a uniform coating of Coal Tar Pitch.

Fourth—Lay over the entire surface two (2) full thicknesses of Tarred Felt, lapping each sheet seventeen (17) inches over the preceding sheet and mopping with Coal Tar Pitch the full width of the seventeen (17) inch lap, so that in no place shall felt touch felt. Each sheet shall be nailed not less than two (2) inches from the upper edge, nails to be spaced not more than two (2) feet apart.

Fifth—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed approximately two hundred (200) pounds of gravel or one hundred and fifty (150) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-fourth ($\frac{1}{4}$) to five-eighths ($\frac{5}{8}$) inch in size, and shall be dry and free from dirt.

Sixth—All loose slag and gravel shall be swept from the surface and a second uniform pouring of Coal Tar Pitch

shall be poured over the slag or gravel, into which, while hot, there shall be applied a second layer of two hundred (200) pounds of gravel or one hundred and fifty (150) pounds of slag. The entire surface shall then be thoroughly broomed free from all loose gravel or slag. It is advisable to roll with a light roller, the finished surface.

GENERAL. All Tarred Felt shall be laid without wrinkles or buckles. Tarred Felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

All Felts shall be turned up not less than four (4) inches at vertical surfaces.

There shall be used not less than two hundred (200) pounds of Coal Tar Pitch for each one hundred (100) square feet of completed roofing surface. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather.

At points where water pressure from the spray is excessive, the roof surface shall be protected with creosoted board platforms or other suitable construction to break the force of the water. These platforms shall be laid on top of the roof surface and not fastened to the deck.

MATERIALS. Materials shall be those as manufactured by Koppers Company, — Co., — Co., — Co., or approved equal applied according to the above specifications.

BOND.—(If a 15-Year Guarantee Maintenance Bond is required.)

The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 15-Year Surety Maintenance Bond to the owner.

FLASHING. For 15-Year Flashing refer to Specifications No. 106 and No. 105.

INSULATION. Refer to Specifications No. 200 and No. 201.



SPRAY POND OR WATER-COOLED ROOF OVER POURED CONCRETE, POURED GYPSUM, PRECAST CONCRETE SLAB OR BOOK TILE

KOPPERS 20-YEAR BUILT UP ROOFING SPECIFICATION NO. 23

(Preferably Dead Level. Maximum Incline One (1) Inch Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be smooth, dry, firm and clean.

APPLICATION OF ROOFING MATERIAL. First—Apply a uniform coating of Coal Tar Pitch to the deck. If precast concrete slab is used, the surface shall be spot or strip mopped; and if Book Tile is used, deck shall be covered with not less than a one (1) inch thickness of Gypsum or Portland Cement Mortar before application of Coal Tar Pitch.

Second—Lay over the entire surface four (4) full thicknesses of Tarred Felt, lapping each sheet twenty-four and one-half ($24\frac{1}{2}$) inches over the preceding sheet, mopping

with Coal Tar Pitch the full twenty-four and one-half ($24\frac{1}{2}$) inches on each sheet so that in no place shall felt touch felt. All felts shall be turned up not less than four (4) inches at vertical surfaces.

Third—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed approximately two hundred (200) pounds of gravel or one hundred and fifty (150) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-fourth ($\frac{1}{4}$) inch to five-eighths ($\frac{5}{8}$) inch in size, and shall be dry and free from dirt.

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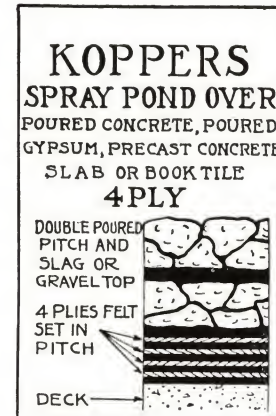
Fourth—All loose slag and gravel shall be swept from the surface and a second uniform pouring of Coal Tar Pitch shall be poured over the slag or gravel, into which, while hot, there shall be applied a second layer of two hundred (200) pounds of gravel or one hundred and fifty (150) pounds of slag. The entire surface shall then be thoroughly broomed free from all loose gravel or slag. It is advisable to roll, with a light roller, the finished surface.

GENERAL. All Tarred Felt shall be laid without wrinkles or buckles. Tarred Felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

There shall be used not less than two hundred and seventy-five (275) pounds of Coal Tar Pitch for each one hundred (100) square feet of completed roofing surface. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather.

At points where water pressure from the spray is excessive, the roof surface shall be protected with creosoted board platforms or other suitable construction to break the force of the water. These platforms shall be laid on top of the roof surface and not fastened to the deck.

MATERIALS. Materials shall be those as manufactured by Koppers Company, — Co., — Co., — Co., or approved equal applied according to the above specifications.



BOND. (If a 20-Year Guaranteed Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 20-Year Surety Maintenance Bond to the owner.

FLASHING. For 20-Year Flashing refer to Specifications No. 107 and No. 104.

INSULATION. Refer to Specifications No. 203 and No. 202.

SPRAY POND OR WATER-COOLED ROOF OVER POURED CONCRETE, POURED GYPSUM, PRECAST CONCRETE SLAB OR BOOK TILE

KOPPERS 15-YEAR BUILT UP ROOFING SPECIFICATION NO. 24

(Maximum Incline One (1) Inch Per Foot)

PREPARATION OF SURFACE TO BE ROOFED. The roof deck shall be smooth, dry, firm and clean

APPLICATION OF ROOFING MATERIAL. First — Apply a uniform coating of Coal Tar Pitch to the deck. If Precast Concrete Slab is used, the surface shall be spot or strip mopped; and if Book Tile is used, deck shall be covered with not less than a one (1) inch thickness of Gypsum or Portland Cement Mortar before application of Coal Tar Pitch.

Second—Lay over the entire surface three (3) full thicknesses of Tarred Felt lapping each sheet twenty-two (22) inches over the preceding sheet, and mopping with Coal Tar Pitch the full twenty-two (22) inches on each sheet so that in no place shall felt touch felt. The felt shall extend up all vertical surfaces not less than four (4) inches.

Third—Pour over the entire surface a uniform coating of Coal Tar Pitch into which, while hot, embed approximately two hundred (200) pounds of gravel or one hundred and fifty (150) pounds of slag for each one hundred (100) square feet. The gravel or slag shall be from one-fourth (¼) inch to five-eighths (⅝) inch in size, and shall be dry and free from dirt.

Fourth—All loose slag and gravel shall be swept from the surface and a second uniform pouring of Coal Tar Pitch shall be poured over the slag or gravel, into which, while hot, there shall be applied a second layer of two hundred (200) pounds of gravel or one hundred and fifty (150)

pounds of slag. The entire surface shall then be thoroughly broomed free from all loose gravel or slag. It is advisable to roll, with a light roller, the finished surface.

GENERAL. All Tarred Felt shall be laid without wrinkles or buckles. Tarred Felt shall weigh not less than fifteen (15) pounds per one hundred (100) square feet.

There shall be used not less than two hundred and fifty (250) pounds of Coal Tar Pitch for each one hundred (100) square feet of completed roofing surface. Pitch shall not be heated above three hundred and seventy-five (375°) degrees F. in cool or cold weather and not above three hundred (300°) degrees F. in hot weather.

At points where water pressure from the spray is excessive, the roof surface shall be protected with creosoted board platforms or other suitable construction to break the force of the water. These platforms shall be laid on top of the roof surface and not fastened to the deck.

MATERIALS. Materials shall be those as manufactured by the Koppers Company, — Co., — Co., — Co., or approved equal applied according to the above specifications.

BOND. (If a 15-Year Guarantee Maintenance Bond is required.) The roofing shall be applied by a roofing contractor approved by the roofing manufacturer, who shall apply the roofing in strict accordance with the specifications and requirements of the manufacturer and subject to their inspection and approval, and upon completion of work furnish the roofing manufacturer's 15-Year Surety Maintenance Bond to the owner.

FLASHING. For 15-Year Flashing refer to Specifications No. 106 and No. 105.

INSULATION. Refer to Specifications No. 203 and No. 202.



GENERAL. The roofing insulation must be kept dry both before and after application.

The following specifications for the installation of insulation are recommended so as to provide and insure the owner the maximum effect and life of the insulation.

KOPPERS COMPANY GUARANTEE BOND COVERING BUILT UP ROOFING AND FLASHING DOES NOT COVER ROOF INSULATION NOR WILL KOPPERS COMPANY BE RESPONSIBLE FOR ANY DAMAGE CAUSED BY OR THE RESULT OF THE USE OF INSULATION.

WOOD NAILING STRIPS. The general contractor shall provide wood nailing strips which shall form a nailing base under all metal flashing aprons and flanges. Strips shall be the full thickness of the insulation and shall extend not less than one (1) inch beyond the apron or flange and shall be securely fastened to the roof deck.

CANT STRIPS. Cant Strips on wood decks shall be set on top of the insulation and secured by nailing through the insulation to the deck. On incombustible decks where the cant is formed with Gypsum or concrete, a square shoulder the full thickness of the insulation at the bottom of the cant shall be formed.

NAILS. Nails shall be galvanized roofing nails driven through flat tin discs, or Simplex flat head roofing nails.

Nails for use with insulation shall be of sufficient length to pass through the insulation and penetrate into, but not

through, the deck construction, with the exception that on steel decks where nailing is necessary, the nails shall be soft-nosed roofing nails which shall not penetrate the steel deck.

CUT-OFFS. Cut-offs consisting of two (2) plies of tarred felt and moppings of Coal Tar Pitch or Asphalt extending onto the deck at least six (6) inches and four (4) inches on top of the insulation, shall be applied at the end of each day's work over exposed edges of insulation. WHEN CORK INSULATION IS USED, CUT-OFFS SHOULD BE REMOVED WHEN WORK IS RESUMED.

All edges of insulation adjoining parapet walls, cants, eaves, vertical surfaces, etc., shall be sealed by applying two (2) plies of Tarred Felt and moppings of Pitch or Asphalt.

GENERAL APPLICATION OF INSULATION. Insulation must be thoroughly dry and of approved type, and must be able to retain nails.

No more insulation shall be laid at any one time than can be protected by pitch and felt in case of sudden weather changes.

Edges of insulation shall be brought closely together and shall not be forced into place. Where insulation joins vertical surfaces, the insulation shall be cut in a neat manner allowing at least one-half ($\frac{1}{2}$) inch clearance.

When more than one (1) layer of insulation is used, joints between layers shall be broken. All layers shall be parallel to preceding layers.

INSULATION SPECIFICATIONS

The following methods of installing insulation are those recommended by Koppers Company.

OVER WOOD DECKS FOR LOW HUMIDITY CONDITIONS

KOPPERS INSULATION SPECIFICATION NO. 200

APPLICATION OF MEMBRANE BELOW INSULATION. The roof deck shall be covered with one (1) layer of red rosin sheathing paper weighing not less than five (5) pounds per one hundred (100) square feet. Sheathing paper shall be lapped two (2) inches and secured to the deck by occasional nailing.

Sheathing paper may be omitted when insulation is laid in two (2) layers providing there are no pitch moppings between the layers.

The insulation shall be secured in place to the deck by

nailing. The nails are to be spaced one (1) foot apart and shall penetrate the deck at least three-fourths ($\frac{3}{4}$) of an inch and shall be placed along the edge and stagger nailed through the longitudinal center of each sheet of insulation. Nailing of two layers of insulation shall be through the lower layer only and not into the deck.

APPLICATION OF ROOFING ABOVE INSULATION. The roofing shall be applied according to Koppers Specifications No. 1, No. 2 and No. 3, with the exception that the red rosin paper may be omitted.

OVER WOOD AND PRECAST GYPSUM DECKS FOR HIGH HUMIDITY CONDITIONS

KOPPERS INSULATION SPECIFICATION NO. 201

APPLICATION OF MEMBRANE BELOW INSULATION. First—The roof deck shall be covered with one (1) layer of red rosin sheathing paper weighing not less than five (5) pounds per one hundred (100) square feet. The sheathing paper shall be lapped two (2) inches and secured to the deck by occasional nailing. On precast gypsum, sheathing may be omitted.

Second—Two full thicknesses of Tarred Felt shall be laid over the entire surface, lapping each sheet seventeen (17) inches over the preceding sheet and nailing as often as may be necessary to hold the sheets in place.

Extend all felts up vertical surfaces not less than eight (8) inches. After the insulation has been laid, turn these eight (8) inch extensions down over the exposed surface of the insulation and thoroughly mop with Coal Tar Pitch when installing flat roofs, and steep pitch when installing steep roofs.

Third—Mop the entire surface with a uniform coating of Coal Tar Pitch into which, while hot, firmly embed the insulation. When roofs have an incline of from two (2) inches to six (6) inches per foot, use Steep Roofing Pitch.

Fourth—Each sheet of insulation shall be secured in place by nailing. Nails shall be spaced one (1) foot apart and shall be placed along the edge and stagger nailed through the longitudinal center of each sheet. Nailing of two layers of insulation shall be through the second or top layer only—do not nail through the first layer.

When insulation is laid in two layers, mop the entire surface of the first layer with Coal Tar Pitch on flat roofs and Steep Pitch on Steep Roofs into which, while hot, embed the second layer of insulation.

APPLICATION OF ROOFING ABOVE INSULATION. Roofing shall be applied according to Koppers Specifications No. 1, 2, 3, 12, 13 and 14.

OVER POURED CONCRETE, GYPSUM AND PRECAST SLAB FOR LOW HUMIDITY CONDITIONS**KOPPERS INSULATION SPECIFICATION NO. 202**

FOR FLAT ROOFS. First—Apply a uniform coating of coal tar pitch to the deck.

If precast concrete slab or tile deck, strip or spot mop with coal tar pitch up to four (4) inches from the edge of each joint. While the pitch is hot immediately embed the insulation.

Second—If there are two (2) layers of insulation, mop the entire first layer with coal tar pitch into which, while hot, embed the second layer of insulation.

FOR STEEP ROOFING HAVING AN INCLINE OF TWO (2) TO SIX (6) INCHES PER FOOT. First—Apply a uniform coating of steep roofing pitch to the deck into which, while hot, embed the insulation.

On precast tile or slab deck, spot or strip mop with steep roofing pitch up to four (4) inches from the edge of each joint.

Second—If there are two (2) layers of insulation, the entire first layer shall be coated with steep roofing pitch into which, while hot, embed the second layer of insulation. Each sheet of insulation shall be secured in place by nailing. If two (2) layers of insulation are used nailing shall be through the first layer only. Nails shall be spaced one (1) foot apart and shall penetrate the deck at least three-quarters ($\frac{3}{4}$) of an inch and shall be spaced along the edge and stagger nailed through the longitudinal center of each sheet of insulation.

When the deck will not permit nailing, which necessitates in nailing strips, insulation shall be secured to each nailing strip with nails spaced approximately one (1) foot apart.

APPLICATION OF ROOFING ABOVE INSULATION. The roofing shall be applied according to Koppers Company's specifications 5, 6, 7, 8, 10, 11, 20, 23 and 24.

OVER POURED CONCRETE, GYPSUM AND PRECAST CONCRETE SLAB FOR HIGH HUMIDITY CONDITIONS**KOPPERS INSULATION SPECIFICATION NO. 203**

APPLICATION OF MEMBRANE BELOW INSULATION FOR FLAT ROOFS. First—Apply a uniform coating of Coal Tar Pitch to the deck. On precast concrete slab or tile deck, spot or strip mop with Coal Tar Pitch up to four (4) inches from the edge of each joint.

Second—Lay over the entire surface two (2) full thicknesses of fifteen (15) pound tarred felt, lapping each sheet seventeen (17) inches over the preceding sheet—mopping with Coal Tar Pitch the full seventeen (17) inches so that in no place shall felt touch felt.

FOR STEEP ROOFS HAVING AN INCLINE FROM TWO (2) TO SIX (6) INCHES PER FOOT. First—Apply a uniform coating of Steep Roofing Pitch to the Deck. On precast concrete or tile, spot or strip mop with Steep Pitch up to four (4) inches from the edge of each joint.

Second—Lay over the entire surface two (2) full thicknesses of fifteen (15) pound Tarred Felt at right angles to the incline of the roof lapping each sheet seventeen (17) inches over the preceding sheet.

Each sheet shall be nailed with one (1) inch barbed roofing nails through flat tin discs eight (8) inches from the upper edge and nails shall be spaced not more than one (1) foot apart. Where nailing strips are used the felt shall be nailed with two (2) nails through flat tin discs at each nailing strip placed six (6) inches and eight (8) inches respectively from the upper edge of each sheet.

Third—(For both Flat and Steep) Extend all plies of felt up vertical surfaces not less than eight (8) inches and after

insulation has been installed turn this eight (8) inch extension down over the exposed edge of insulation and thoroughly mop with coal tar pitch. (Steep Pitch for Steep Roofing.)

APPLICATION OF INSULATION FOR FLAT ROOFS. First—Apply a uniform coating of Coal Tar Pitch over the entire surface into which, while hot, embed the insulation. If there are two (2) layers of insulation mop the entire surface of the first layer with Coal Tar Pitch into which, while hot, embed the second layer of insulation.

FOR STEEP ROOFS HAVING A SLOPE OF FROM TWO (2) TO SIX (6) INCHES PER FOOT. First—Apply a uniform coating of Steep Roofing Pitch over the entire surface into which, while hot, embed the insulation. Each sheet of insulation shall be secured in place by nailing. Nails shall be spaced approximately one (1) foot apart and shall penetrate the deck at least three-fourths ($\frac{3}{4}$) of an inch and shall be placed along edge and stagger nailed through the longitudinal center of each sheet of insulation.

When the deck will not permit nailing, which necessitates in providing nailing strips, insulation shall be secured to each nailing strip with nails spaced approximately one (1) foot apart. Nailing of two layers of insulation shall be through the top layer only. Do not nail the first layer.

APPLICATION OF ROOFING ABOVE INSULATION. The roofing shall be applied according to Koppers Company's Specifications No. 5, 6, 7, 8, 10, 11, 20, 23 and 24.

OVER STEEL DECKS FOR HIGH HUMIDITY CONDITIONS**KOPPERS INSULATION SPECIFICATION NO. 204**

Koppers Company Will Not Bond Roofing Over Steel Decks Unless the Steel Deck Is Insulated

APPLICATION OF MEMBRANE BELOW INSULATION. First—Mop the steel deck with Steep Asphalt.

Second—Lay over the entire surface two (2) full thicknesses of fifteen (15) pound Asphalt Felt, lapping each sheet seventeen (17) inches over the preceding sheet.

Extend all felts up on vertical surfaces not less than eight (8) inches. After the insulation has been laid turn these eight (8) inch extensions down over the exposed surface of the insulation and thoroughly mop with Coal Tar Pitch when installing flat roofs and Steep Pitch when installing Steep Roofs.

form coating of Steep Asphalt into which, while hot, embed the insulation.

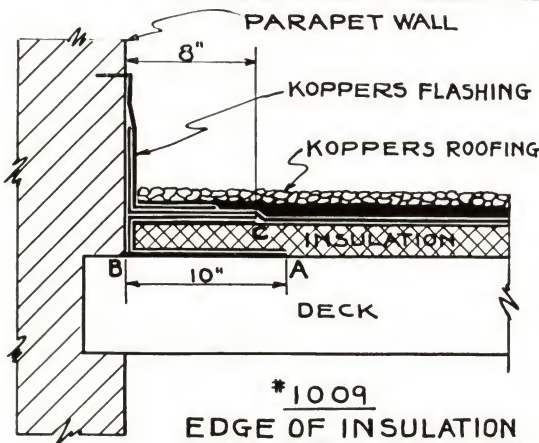
When more than one (1) layer of insulation is applied, the top surface of each layer shall be coated with Steep Asphalt into which, while hot, embed the succeeding layer.

When the incline of the roof exceeds one (1) inch per foot, the insulation shall be secured to the deck through the top layer with the proper devices provided by the deck manufacturer.

APPLICATION OF ROOFING ABOVE INSULATION. The roofing shall be installed according to Koppers Company's Specifications Nos. 17, 18 or 19 above insulation.

METHOD OF WATERPROOFING INSULATION

WITHOUT WATERPROOFING UNDER INSULATION



WHEN INSULATION IS APPLIED WITHOUT WATERPROOFING ON UNDERSIDE, EDGES OF INSULATION SHALL BE PROTECTED BY THE APPLICATION OF 2 PLIES OF TARRED FELT. THIS FELT TO EXTEND UNDER INSULATION AT LEAST 10" AND OVER INSULATION AT LEAST 8"

WITH WOOD OR PRECAST GYPSUM DECKS MOP FELT WITH PITCH FROM POINTS "B" TO "C" AND NAIL TO DECK FROM POINTS "A" TO "B".

WITH POURED CONCRETE, POURED GYPSUM, PRECAST CONCRETE & BOOK TILE DECKS MOP FELT WITH PITCH FROM POINTS "A" TO "C".

WITH STEEL DECKS MOP FELT WITH STEEP ASPHALT FROM POINTS "A" TO "B" AND WITH PITCH FROM POINTS "B" TO "C".

WITH WATERPROOFING UNDER INSULATION

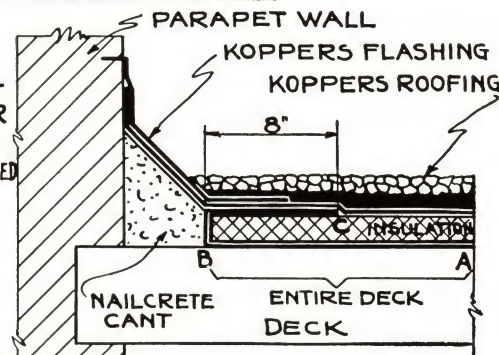
WHEN INSULATION IS APPLIED WITH WATERPROOFING ON UNDERSIDE, EDGES OF INSULATION SHALL BE PROTECTED BY EXTENDING THE UNDERSIDE PLIES OF TARRED FELT UP EDGES AND OVER INSULATION AT LEAST 8".

MOPPING OF FELT TO BE THE SAME AS DESCRIBED ABOVE FOR DIFFERENT TYPES OF DECKS, EXCEPT THAT POINTS "A" TO "B" WILL INDICATE THAT THE ENTIRE SPAN OF THE DECK WILL BE TREATED.

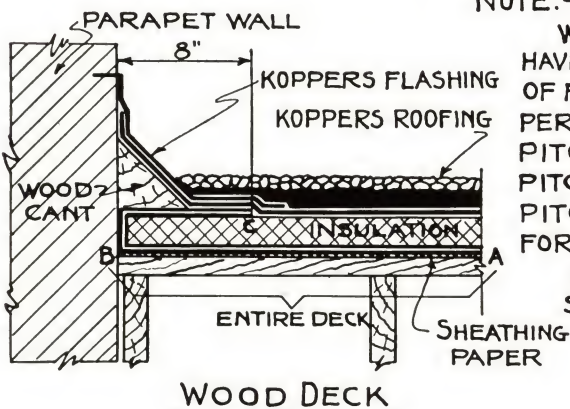
NOTE:-

WHEN ROOFS HAVE AN INCLINE OF FROM 2" TO 6" PER FOOT, SUBSTITUTE PITCH WITH STEEP PITCH WHEREVER PITCH IS CALLED FOR ABOVE.

WHEN USING NAILCRETE CANT IT SHALL BE CONSTRUCTED WITH A SHOULDER THE FULL THICKNESS OF THE INSULATION. WOOD CANTS SHALL BE NAILED TO DECK AFTER INSULATION HAS BEEN INSTALLED.



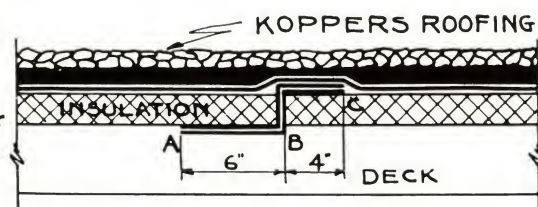
POURED CONCRETE, POURED GYPSUM, PRECAST CONCRETE BOOK TILE OR STEEL DECKS.



METHOD OF INSTALLING INSULATION CUT-OFFS

AT THE END OF EACH WORKING DAY, EDGE OF INSULATION SHALL BE PROTECTED WITH 2 PLIES OF TARRED FELT IN A MANNER SO THAT WHEN THE NEXT DAYS WORK IS RESUMED, THERE SHALL BE A COMPLETED JOINT AS HERE SHOWN. WHEN CORK INSULATION IS USED, CUT-OFFS SHOULD BE REMOVED WHEN WORK IS RESUMED.

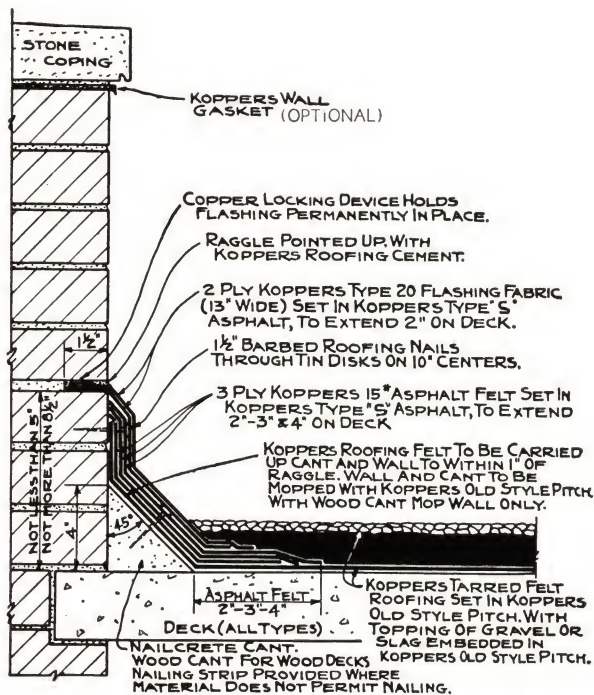
MOPPING OF FELT TO BE THE SAME AS DESCRIBED ABOVE FOR DIFFERENT TYPES OF DECKS.



#1008
END OF DAYS WORK

GENERAL. All Flashing Fabric and Asphalt Felt shall be free from wrinkles and buckles.

BOND. If a Koppers 10, 15 or 20-Year Guarantee Flashing Bond is required the flashing must be installed in connection with a Koppers Bonded Roof, the Flashing Bond being for no greater period than the Roofing Bond. Flashing and Roofing shall be installed by a roofing contractor approved by Koppers Company who shall apply Roofing and Flashing in strict accordance with the specifications and requirements of Koppers Company, and subject to their inspection and approval.



Koppers 20-Year Bonded Flashing Specification No. 104

KOPPERS 20-YEAR BONDED FLASHING SPECIFICATION No. 104

BRIEF SPECIFICATION (For Architects and Engineers)
The Flashing shall be KOPPERS 20-Year Type, Specification No. 104.

DETAILED SPECIFICATIONS

APPLICATION. Extend all roofing plies of felt and moppings of pitch up the wall to within one (1) inch of the raggle.

Apply a uniform coating of KOPPERS Type S Asphalt over the roofing extending from the raggle to not less than two (2) inches on to the roof deck. Into the Type S Asphalt embed one (1) ply of KOPPERS 15-Lb. Asphalt Felt, extending from the raggle not less than two (2) inches on to the roof deck. On top of this Flashing strip apply another uniform coating of KOPPERS Type S Asphalt and another Flashing strip, this application being repeated until a three (3) ply reinforcement has been completed. Each strip shall extend on to the deck roofing one (1) inch beyond preceding strip. Felt reinforcement Flashing strips shall not exceed ten (10) feet three (3) inches in length, and there shall be a three (3) inch end lap between adjoining strips.

A uniform coating of KOPPERS Type S Asphalt shall be applied between end laps.

Each Flashing reinforcement strip shall be set in separately and joints must be broken with the underlying Flashing reinforcement strip.

The top ply of Flashing reinforcement shall be nailed in the middle of the cant and half-way between the top of the cant and raggle every ten (10) inches with one and one-half (1 1/2) inch barbed roofing nails through flat tin discs.

Over the entire reinforcement strip and into the full depth of the raggle apply a uniform coating of KOPPERS Type S Asphalt. Insert and fasten the upper part of KOPPERS 20-Year Type Flashing Fabric securely into the raggle by means of the copper locking device riveted to the flashing and press the flashing fabric into the coating of

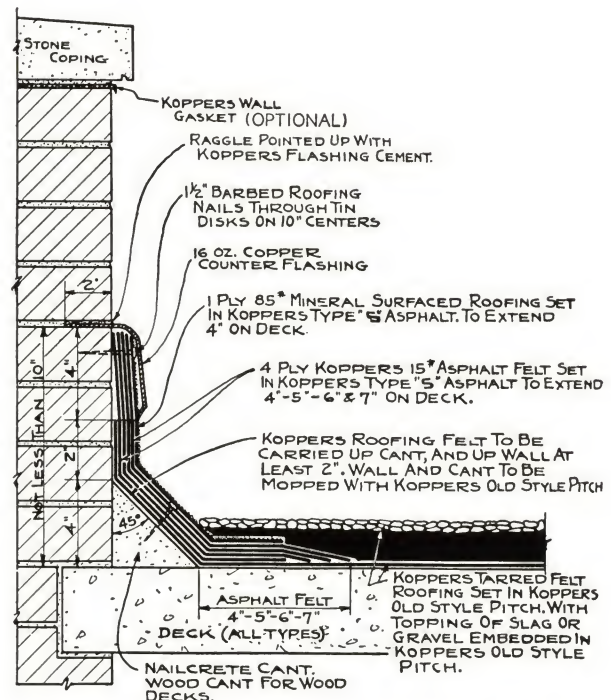
(Continued in next column)

KOPPERS Type S Asphalt on the reinforcement plies. Apply a uniform coating of KOPPERS Type S Asphalt between the first and second plies of KOPPERS Flashing Fabric, pressing the top ply securely into the Type S Asphalt. All fabric Flashing strips are ten (10) feet three (3) inches long, and each strip shall overlap the preceding strip three (3) inches.

A uniform coating of KOPPERS Type S Flashing shall be applied between end laps.

Fill the raggle completely with KOPPERS Roof Cement.

GENERAL. Flashing Fabric shall be installed immediately so as to prevent seepage of water behind reinforcement strips.



Koppers 20-Year Bonded Flashing Specification No. 107

KOPPERS 20-YEAR BONDED FLASHING SPECIFICATION No. 107

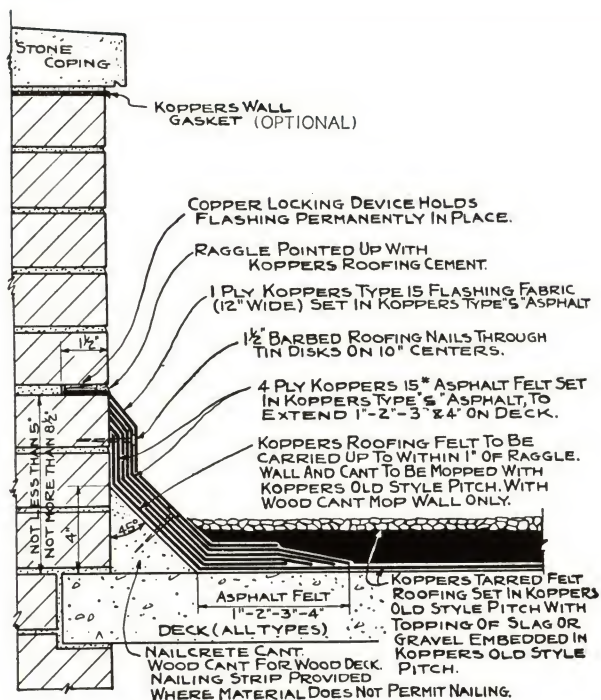
BRIEF SPECIFICATION (For Architects and Engineers)
The flashing shall be installed according to KOPPERS Flashing Specification No. 107.

DETAILED SPECIFICATIONS

APPLICATION. Application shall be the same as flashing specification No. 106 except that four (4) plies of 15-Lb. Asphalt Felt shall be installed as reinforcing plies.

METAL CAP FLASHING FOR SPECIFICATIONS Nos. 101, 106 AND 107. Metal cap flashing shall be installed immediately so as to prevent seepage of water behind the base flashing. We recommend that 14 oz. cold rolled copper be used for 15 and 20-year flashing specifications.

Metal cap flashing shall extend into the raggle not less than two (2) inches and shall have a four (4) inch exposed apron extending down over the base flashing. After the metal cap flashing has been installed completely fill the raggle groove with KOPPERS Roof Cement.



Koppers 15-Year Bonded Flashing Specification No. 105

KOPPERS 15-YEAR BONDED FLASHING SPECIFICATION No. 105

BRIEF SPECIFICATION (For Architects and Engineers)
The Flashing shall be KOPPERS 15-Year Type Specification No. 105.

DETAILED SPECIFICATIONS

APPLICATION. Extend all roofing plies of felt and mopings of pitch up the wall to within one (1) inch of the raggle.

Apply a uniform coating of KOPPERS Type S Asphalt over the roofing extending from the raggle to not less than two (2) inches on to the roof deck. Into the Type S Asphalt embed one (1) ply of KOPPERS 15-Lb. Asphalt Felt, extending from the raggle to not less than two (2) inches on the roof deck. On top of this Flashing Strip apply another uniform coating of KOPPERS Type S Asphalt and other Flashing Strip, this application being repeated until a four (4) ply reinforcement has been completed. Each strip shall extend on to the deck roofing one (1) inch beyond preceding strip. Felt reinforcement Flashing Strips shall not exceed ten (10) feet three (3) inches in length, and there shall be a three (3) inch end lap between adjoining strips.

A uniform coating of KOPPERS Type S Asphalt shall be applied between end laps.

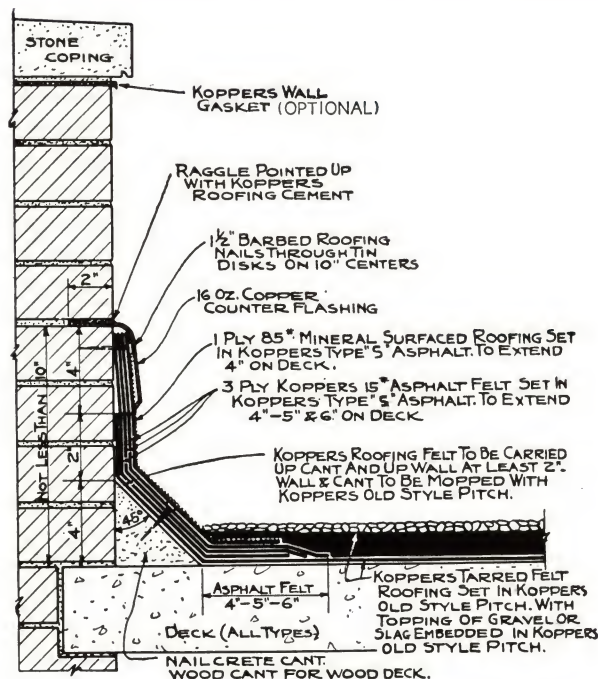
Each Flashing reinforcement strip shall be set in separately and joints must be broken with the underlying Flashing reinforcement strip.

The top ply of Flashing reinforcement shall be nailed in the middle of the cant and half-way between the top of the cant and raggle every ten (10) inches with one and one-half (1½) inch barbed roofing nails through flat tin discs.

Over the entire reinforcement strip and into the full depth of the raggle apply a uniform coating of KOPPERS Type S Asphalt. Insert and fasten the upper part of KOPPERS 15-Year Flashing Fabric securely into the raggle by means of the copper locking device riveted to the flashing and press the flashing fabric into the coating of KOPPERS Type S Asphalt on the reinforcement plies. All Fabric Flashing strips are ten (10) feet three (3) inches long and each strip shall overlap the preceding strip three inches. A uniform coating of KOPPERS Type S Asphalt shall be applied between end laps.

Fill the raggle completely with KOPPERS Roof Cement.

GENERAL. (Specifications Nos. 103, 104 and 105). Flashing Fabric shall be installed immediately so as to prevent seepage of water behind reinforcement strips.



Koppers 15-Year Bonded Flashing Specification No. 106

KOPPERS 15-YEAR BONDED FLASHING SPECIFICATION No. 106

BRIEF SPECIFICATION (For Architects and Engineers)
The flashing shall be installed according to KOPPERS Flashing Specification No. 106.

DETAILED SPECIFICATIONS

APPLICATION. Extend all plies of roofing felt and mopings of pitch up the wall to within 1 inch of the raggle.

Apply a uniform coating of KOPPERS Type S Asphalt over the roofing extending from the raggle to not less than two (2) inches on to the roof deck. Into the Type S Asphalt embed one (1) ply of KOPPERS 15-Lb. Asphalt Felt extending from the raggle to not less than two (2) inches on to the roof deck. On top of this flashing strip apply another uniform coating of KOPPERS Type S Asphalt and another flashing strip. Repeat this application until a three-ply reinforcement has been completed. Each flashing strip shall extend on to the deck roofing one (1) inch beyond the preceding strip.

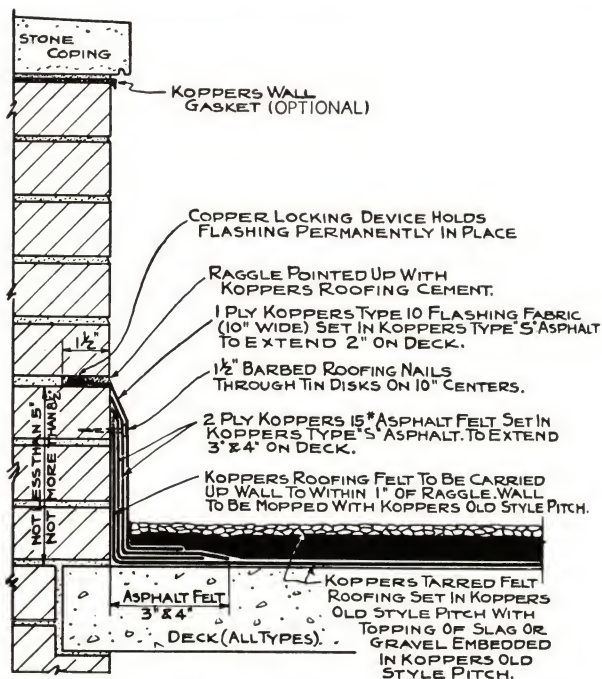
The top ply of flashing reinforcement shall be nailed in the middle of the cant every ten (10) inches with one and one-half (1½) inch barbed roofing nails through flat tin discs.

Coat the entire surface of the asphalt felt flashing reinforcement strip uniformly with KOPPERS Type S Asphalt and embed immediately one (1) layer of eighty-five (85) pound mineral surfaced roofing cut so as to extend from the raggle to the deck angle. Reinforcing felt and mineral surfaced roofing shall be securely fastened at the top with one and one-half (1½) inch barbed roofing nails through flat tin discs to prevent slipping, nails to be spaced every ten (10) inches in the vertical mortar joints or nail strips.

All end joints of felt reinforcement strips shall break joints with underlying strip.

All felt reinforcement and mineral surface roofing strips shall not exceed ten (10) feet three (3) inches in length and there shall be a three (3) inch end lap between adjoining strips.

METAL CAP FLASHING. Refer to details explained following Specification No. 107.



Koppers 10-Year Bonded Flashing Specification No. 103

KOPPERS 10-YEAR BONDED FLASHING SPECIFICATION No. 103

BRIEF SPECIFICATION (For Architects and Engineers)
The Flashing shall be KOPPERS 10-Year Type, Specification No. 103.

DETAILED SPECIFICATIONS

APPLICATION. Extend all roofing plies of felt and moppings of Pitch to within one (1) inch of the raggle.

Apply a uniform coating of KOPPERS Type S Asphalt over the roofing extending from the raggle to not less than two (2) inches on to the roof deck. Into the Type S Asphalt embed one (1) ply of KOPPERS 15-Lb. Asphalt Felt extending from the raggle to not less than two (2) inches on to the roof deck. On top of this Flashing Strip apply another uniform coating of KOPPERS Type S Asphalt and another Flashing Strip, this application being the same as the first application strip. Each strip shall extend on to the deck roofing one (1) inch beyond the preceding strip. Felt reinforcement Flashing Strips shall not exceed ten (10) feet three (3) inches in length and there shall be a three (3) inch end lap between adjoining strips.

A uniform coating of KOPPERS Type S Asphalt shall be applied between end laps.

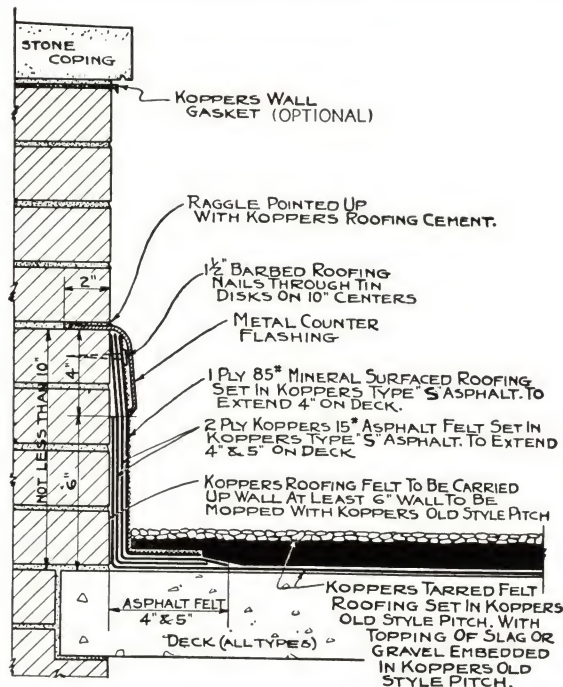
Each flashing reinforcement strip shall be set in separately and joints must be broken with the underlying Flashing reinforcement strip.

Nail through top of felt reinforcement strips and roofing felts every ten (10) inches in horizontal or vertical mortar joints with one and one-half (1 1/2) inch barbed roofing nails through flat tin discs.

Over the entire reinforcement strip and into the full depth of the raggle apply a uniform coating of KOPPERS Type S Asphalt. Insert and fasten the upper part of KOPPERS Type 10 Flashing Fabric securely into the raggle by means of the copper locking device riveted to the Flashing and press the flashing fabric into the coating of KOPPERS Type S Asphalt on the reinforcement plies. All fabric flashing strips are ten (10) feet three (3) inches long and each strip shall overlap the preceding strip three (3) inches. A uniform coating of KOPPERS Type S Asphalt shall be applied between end laps.

Fill the raggle completely with KOPPERS Roof Cement.

GENERAL. Flashing Fabric shall be installed immediately so as to prevent seepage of water behind reinforcement strips.



Koppers 10-Year Bonded Flashing Specification No. 101

KOPPERS 10-YEAR BONDED FLASHING SPECIFICATION No. 101

BRIEF SPECIFICATION (For Architects and Engineers)
The flashing shall be installed according to KOPPERS Flashing Specification No. 101.

DETAILED SPECIFICATIONS

APPLICATION. All plies of roofing felt and moppings of pitch shall be carried up perpendicular surfaces at least six (6) inches.

Apply a uniform coating of KOPPERS Type S Asphalt to a height of not less than ten (10) inches on the perpendicular surface and four (4) inches out on the deck roofing into which embed one (1) ply of KOPPERS 15-Lb. Asphalt Felt cut so as to completely cover the coating of KOPPERS Type S Asphalt.

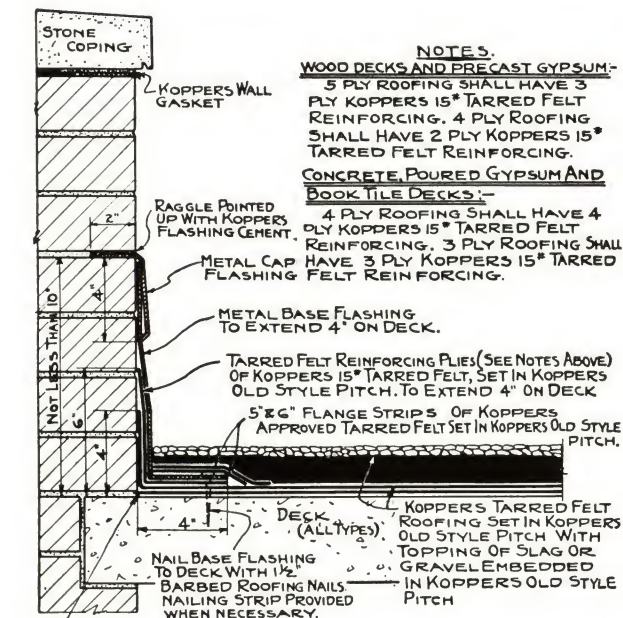
Coat this reinforcing strip of felt uniformly with KOPPERS Type S Asphalt and install another reinforcing ply of KOPPERS 15-Lb. Asphalt Felt. This strip to extend on to the deck roofing one (1) inch beyond the edges of the preceding strip.

Coat the entire surface of the asphalt felt flashing reinforcement strip uniformly with KOPPERS Type S Asphalt and embed immediately one (1) layer of eighty-five (85) pound mineral surfaced roofing cut so as to extend from the raggle to the deck angle. Reinforcing felt and mineral surfaced roofing shall be securely fastened at the top with one and one-half (1 1/2) inch barbed roofing nails through flat tin discs to prevent slipping, nails to be spaced every ten (10) inches in the vertical mortar joints or nail strips.

All end joints of felt reinforcement strips shall break joints with underlying strip.

All felt reinforcement and mineral surface roofing strips shall not exceed ten (10) feet three (3) inches in length and there shall be a three (3) inch end lap between adjoining strips.

METAL CAP FLASHING. Refer to details explained following Specification No. 107.



NOTE:— FOR CONCRETE, POURED GYPSUM AND BOOK TILE DECKS, ALL PLIES OF ROOFING FELT SHALL BE CUT OFF AT WALL. FOR ALL OTHER TYPES OF DECKS 2 PLIES ROOFING FELT TO BE CARRIED UP WALL 4\"

Koppers Flashing Specification No. 100 (Not Bonded)

METAL CAP AND BASE FLASHING— KOPPERS SPECIFICATION No. 100

BRIEF SPECIFICATION (For Architects and Engineers)
The flashing shall be installed according to KOPPERS Specification No. 100.

DETAILED SPECIFICATIONS

APPLICATION. When a metal base flashing is used, felt reinforcement at all wall angles, skylight curbs and other vertical surfaces shall be installed as follows:

BOARD AND PRECAST GYPSUM DECKS. The felt in the first two plies of the roof shall be carried up perpendicular surfaces at least four (4) inches, and the remaining plies cut off at the angle of the roof deck and perpendicular surfaces.

(*) Felt reinforcing plies shall then be set in separately, all cemented solidly together and to the underlying surface with pitch. The first ply shall extend out on the deck roofing at least four (4) inches, each ply extending one (1) inch beyond the preceding ply, and up the perpendicular surface at least six (6) inches; the last ply to be mopped with pitch before the metal base flashing is set in place. All end joints shall be broken with the underlying reinforcing strip.

CONCRETE, POURED GYPSUM, BOOK TILE DECKS. All plies of felt used in the roofing shall be cut off at the angle of the roof deck and perpendicular surfaces.

(**) Felt reinforcing plies shall then be set in separately, all cemented solidly together and to the underlying surface with pitch. The first ply shall extend out on the deck roofing at least four (4) inches, each ply extending one (1) inch beyond the preceding ply, and up the perpendicular surface at least six (6) inches; the last ply to be mopped with pitch before the metal base flashing is set in place. All end joints shall be broken with the underlying reinforcing strip.

INSTALLATION OF METAL BASE FLASHING. The metal base flashing shall extend up the wall not less than ten (10) inches and on the deck not less than four (4) inches. The base flashing shall be nailed to the deck, and if deck does not permit nailing a creosoted wood nailing strip must be provided. Nails shall be spaced not more than four (4) inches apart and within one (1) inch from the outer edge of the metal base flange.

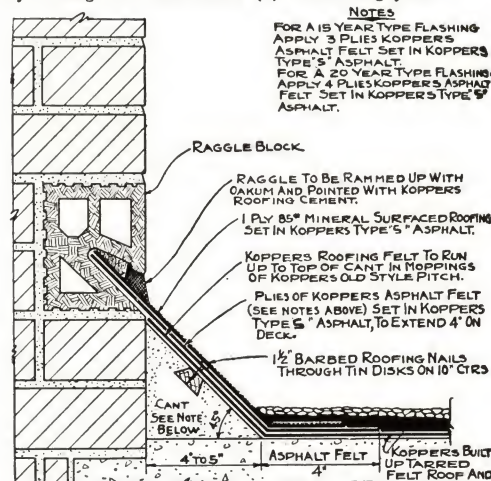
Two (2) tarred felt strips shall then be applied over the entire metal base flange which extends on to the roof, the top strip extending two (2) inches beyond the lower strip,

(Continued top of next column)

these strips to be not less than double the width of the flange and cemented solidly together and to the flange with pitch. Apply over the surface a mopping of pitch.

Cap Flashing shall be installed immediately so as to prevent seepage of water behind the base flashing.

- * 5 Ply roofing shall have three (3) reinforcing plies.
- 4 Ply roofing shall have two (2) reinforcing plies.
- ** 4 Ply roofing shall have four (4) reinforcing plies.
- 3 Ply roofing shall have three (3) reinforcing plies.



NOTE: THIS DETAIL APPLIES TO CONCRETE, TILE, GYPSUM AND WOOD DECKS, EXCEPT THAT ON WOOD DECKS THE CANT STRIP IS TO BE WOOD.

Koppers Raggle Block Flashing Specification No. 102

KOPPERS RAGGLE BLOCK FLASHING SPECIFICATION No. 102

BRIEF SPECIFICATION (For Architects and Engineers)
The flashing shall be Raggle Block Type installed according to KOPPERS Specification No. 102.

DETAILED SPECIFICATIONS

APPLICATION. Extend all roofing plies of felt and moppings of pitch up the cant to the wall angle.

See that the flashing groove in the raggle block is free of all foreign material. Then apply a uniform coating of KOPPERS Type S Asphalt over the roofing and extend it full depth into the flashing groove. Next insert one (1) ply of KOPPERS 15-Lb. Asphalt Felt full depth into the Raggle Groove and extend it two (2) inches on to the roof deck. On top of the flashing reinforcement strip apply another uniform coating of KOPPERS Type S Asphalt and another flashing strip, this strip to extend on to roofing deck felts one (1) inch beyond the preceding strip. Repeat this application until a three (3) ply 15-Year Type or four (4) ply 20-Year Type reinforcement has been completed.

Felt reinforcement flashing strips shall not exceed ten (10) feet three (3) inches in length and there shall be a three (3) inch end lap between adjoining strips. A uniform coating of KOPPERS Type S Asphalt shall be applied between laps.

Each flashing reinforcement strip shall be set in separately and joints must be broken with the underlying flashing reinforcement strip.

The top of flashing reinforcement shall be nailed in the middle of the cant every ten (10) inches with one and one-half (1½) inch barbed roofing nails through flat tin discs.

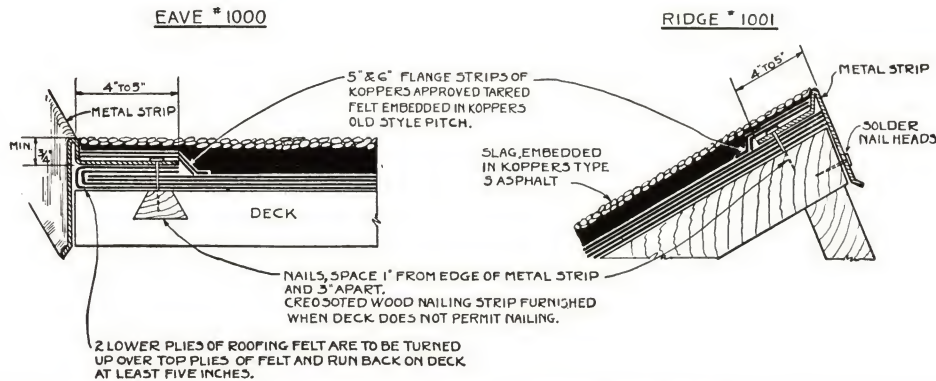
Over the entire reinforcement strip, and into the full depth of the raggle apply a uniform coating of KOPPERS Type S Asphalt, into which embed one (1) layer of eighty-five (85) pounds Mineral Surfaced Roofing extending from the full depth of the raggle groove not less than three (3) inches on to the roof deck.

Mineral surfaced roofing strips shall not exceed ten (10) feet three (3) inches in length and there shall be a three (3) inch lap between adjoining strips. A uniform coating of KOPPERS Type S Asphalt shall be applied between laps.

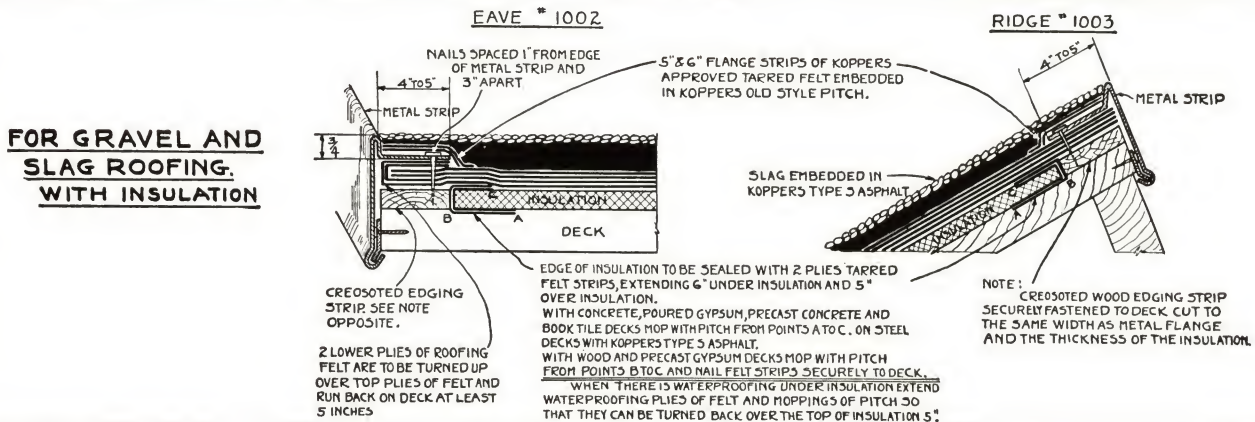
Insert oakum into the full depth of the raggle groove, pressing firmly into place, then fill the raggle completely with KOPPERS Roof Cement.

GENERAL. All asphalt felt and mineral surfaced roofing shall be free from wrinkles and buckles.

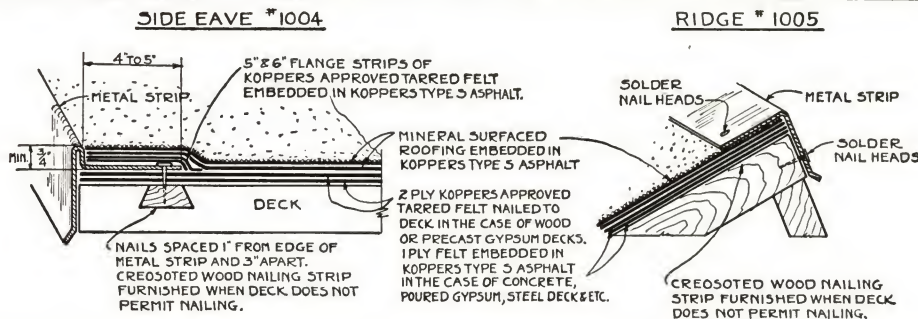
TYPICAL METAL FINISHING STRIPS



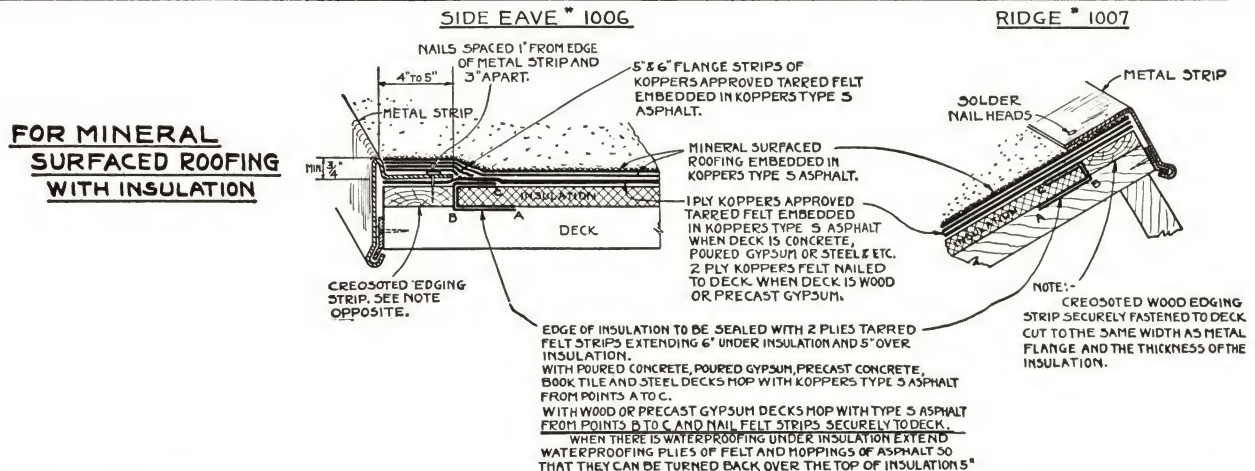
**FOR GRAVEL AND
SLAG ROOFING
WITHOUT INSULATION**



**FOR GRAVEL AND
SLAG ROOFING
WITH INSULATION**



**FOR MINERAL
SURFACED ROOFING
WITHOUT INSULATION**



**FOR MINERAL
SURFACED ROOFING
WITH INSULATION**

KOPPERS WALL WATERPROOFING

Every building of masonry construction should have adequate flashings built in the walls to impede the movement of moisture through inter-connecting voids in the masonry. These flashings protect spandrel beams, reinforcing steel, steel window and door frames against corrosion. Coating the interior surfaces of all exterior walls with Koppers Waterproofing Pitch or Koppers Dampproofing Paint produces a moisture-repellent film between the structural walls and furring.

Specification—Install flashings as shown on detail. In all places two (2) plies of Koppers Tarred Fabric set in three (3) trowel coatings of Koppers Plastic Cement shall be constructed. All flashing shall terminate one-half (½) inch from wall exteriors.

The interior surfaces of all exterior walls shall be brushed or sprayed with Koppers Concrete Priming Oil, using one (1) gallon for each two hundred (200) square feet. Eight (8) to twenty-four (24) hours later the well primed surfaces shall be mopped with Koppers Waterproofing Pitch. Two (2) coatings using a total of thirty (30) pounds of pitch for each one hundred (100) square feet shall be applied, permitting the first coating to cool before applying the second.

Alternate—(To be used in place of pitch moppings.).

Two coatings of Koppers Dampproofing Paint shall be applied by brush or spray using not less than one (1) gallon for each one hundred and fifty (150) square feet of surface and permitting the first coating to dry for not less than three (3) hours before making the second application.

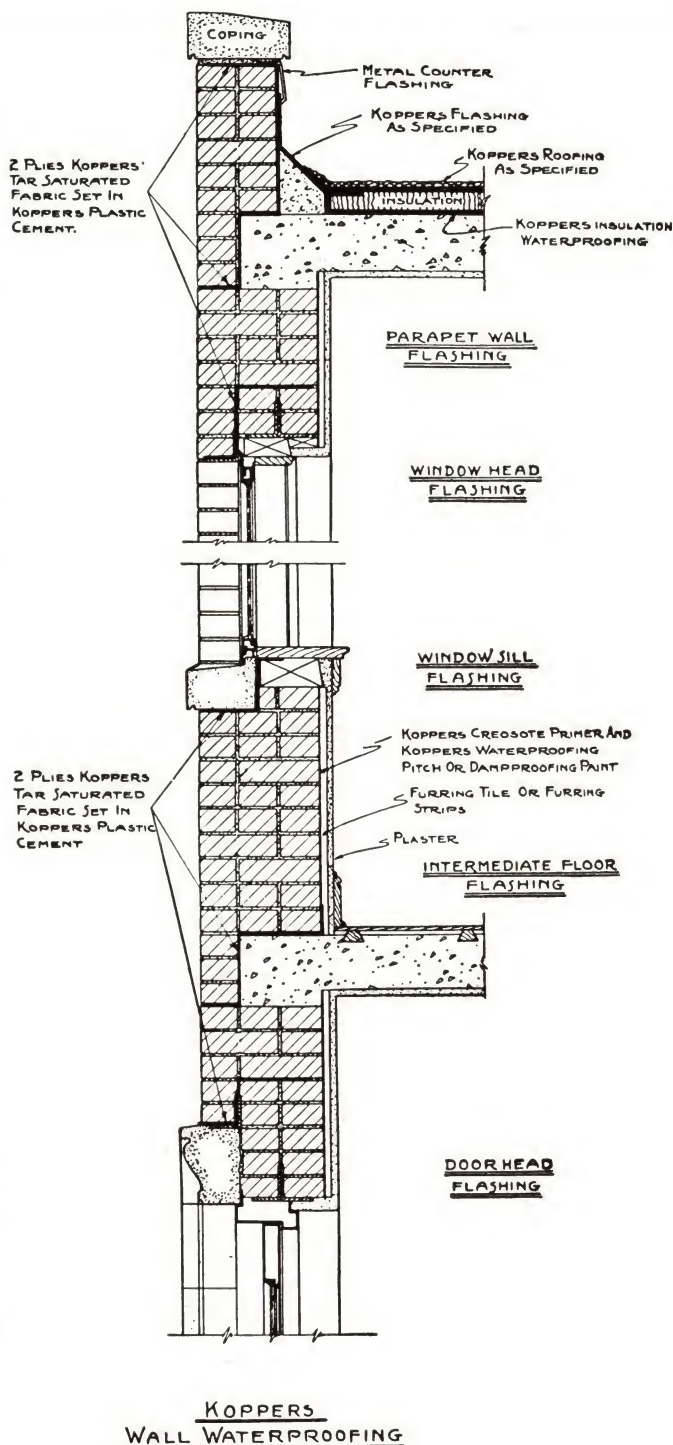
DAMPPROOFING AND WATERPROOFING FLOORS OF SUPERSTRUCTURES

Dampproofing—Paint Method

The concrete floor slab shall be given a smooth finish. As soon as the cement finish has taken its initial set, one spray or brush coating of Koppers Dampproofing Paint shall be applied. Six (6) to twenty-four (24) hours later a second application shall be made. Painting shall be continued up the walls for not less than four (4) inches. One gallon of paint shall be used for each one hundred (100) square feet of surface. Green concrete which has been painted with Koppers Dampproofing Paint does not require sprinkling with water for curing. But if desired, the two coatings of paint can be applied after the concrete is dry. The wood sub-floor or finished cement floor shall be laid eight (8) to twenty-four (24) hours after the second application of paint.

Membrane System—Wood Floors

Lay over the entire surface two (2) thicknesses of red rosin paper (weighing not less than five (5) pounds per one hundred (100) square feet) lapping each sheet nineteen (19) inches over the preceding sheet. Nail to hold in place. Lay one (1) thickness of Approved Tarred Felt with two (2) inch side laps and six (6) inch end laps and nail as required to hold in place. Mop the entire surface with Old Style Pitch and into the pitch lay one (1) ply of Approved



Tarred Felt with side laps of two (2) inches and end laps of six (6) inches. All laps shall be mopped so that in no place does felt touch felt. The entire surface shall then be mopped with pitch and the floor plank shall be embedded in the hot pitch. At corners and angles two additional plies of felt shall be installed, alternately mopped and run up the walls, etc., not less than three (3) inches above the level of the finished flooring, where they shall be fastened securely and protected. The finished flooring shall be nailed to the embedded plank immediately. Nails of suitable length shall be used to avoid penetrating through planks into the waterproofing.



Koppers Membrane Waterproofing Applied on Concrete Floor of Indoor Tennis Courts at Allegheny Country Club, Sewickley, Pa.

Membrane System—Poured Concrete Floors

Lay over the entire surface two (2) thicknesses of Approved Tarred Felt, lapping each sheet seventeen (17) inches over the preceding sheet, mopping the full width of the lap with Old Style Pitch so that in no place does felt touch felt. Then coat the entire surface with Old Style Pitch. Not less than seventy (70) Pounds of pitch shall be used for completing the waterproofing on each one hundred (100) square feet of surface. At all corners and angles two additional plies of felt shall be installed and mopped similarly and these shall be carried up the walls, etc., not less than three (3) inches above the level of the finished flooring where they shall be fastened securely and protected. The finished flooring shall be installed immediately.

KOPPERS DAMPPROOFING AND TERMITE PROOFING—PITCH METHOD

USES. For all brick or concrete foundations and abutments where back-fill will be used.

DETAILED SPECIFICATIONS

APPLICATION. *Note*—The surfaces should be free from all dirt. All cracks should be thoroughly wetted with water and then filled with Portland Cement Mortar.

First—Over the entire surface to be dampproofed apply a uniform brush coat of KOPPERS Concrete Priming Oil. Approximately one (1) gallon should be used for each one hundred (100) square feet.

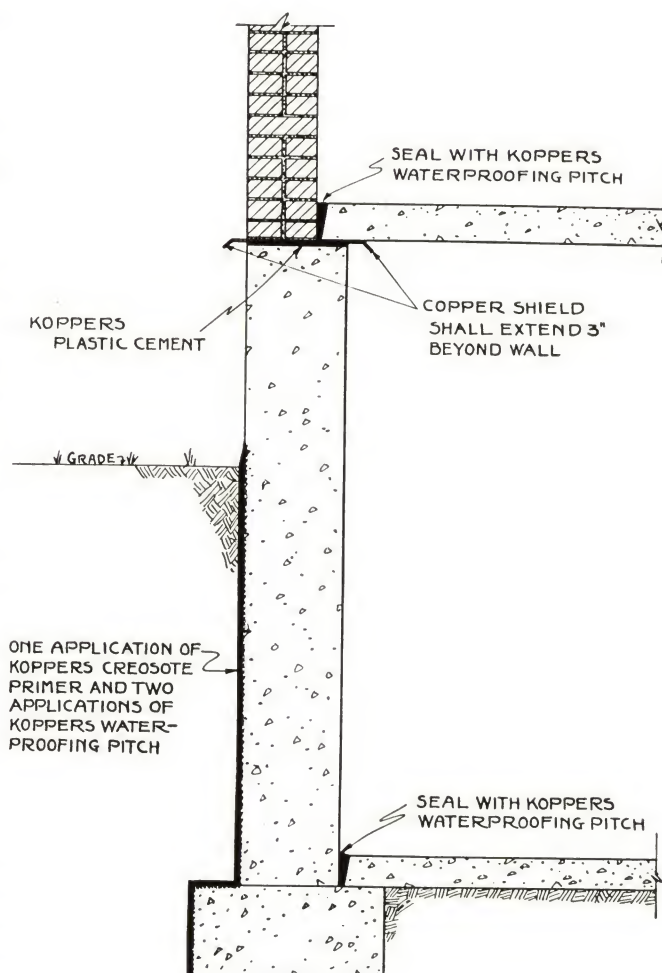
Second—Apply a mopping of KOPPERS Waterproofing Pitch. Approximately twenty-five (25) pounds per one hundred (100) square feet shall be used and the pitch shall be heated to a temperature at which it is entirely liquid, but this temperature shall not exceed three hundred and seventy-five (375) degrees Fahrenheit.

Third—A second mopping of Waterproofing Pitch shall then be applied over the entire surface of the first mopping. Approximately twenty-five (25) pounds per one hundred (100) square feet shall be used so that the entire amount of pitch applied shall amount to a total of approximately fifty (50) pounds per one hundred (100) square feet.

Fourth—The permanent back-fill shall be tamped into place immediately after the last mopping is applied.

Fifth—For additional protection against termites, coal tar pitch seals shall be provided at all places where floor slabs join foundation walls and between adjacent slabs. Seals shall be completely filled with KOPPERS Waterproofing Pitch. Also 20 oz. copper shields set in KOPPERS Plastic Cement shall be installed on top of all foundation walls as detailed.

Note—Use KOPPERS Membrane Waterproofing when a head of water is encountered. See Page 32.



KOPPERS
DAMP AND TERMITE PROOFING
PITCH METHOD

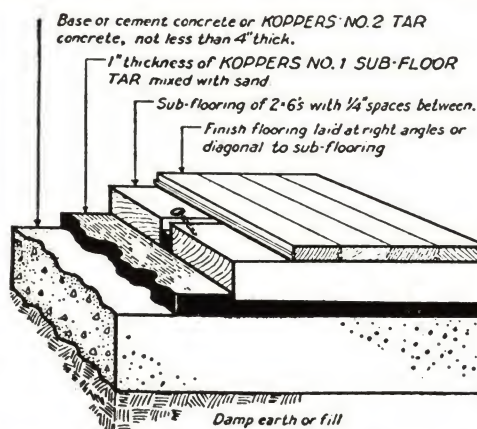
KOPPERS SUB-FLOOR TAR DAMPPROOFING

6
7

In basements where the ground is damp and it is desired to use a wood finish floor, an effective damp-proofing is necessary. The earth should be leveled off to proper grade. If earth or cinder fill is used it should be puddled and rolled or tamped to thoroughly compact it. The sub-base may be either a cement-concrete slab installed in the usual way, or a slab of KOPPERS No. 2 SUB-FLOOR TAR concrete. A cubic yard of crushed stone or gravel passing a 2¼" sieve but retained on a ¼" sieve is mixed with approximately 10 gallons of KOPPERS No. 2 SUB-FLOOR TAR which has been heated. This should be thoroughly rolled or tamped and brought to accurate grade.

Over the slab the dampproofing course is placed. One cubic yard of clean torpedo sand is heated (210° to 250° F.) and mixed with 25 to 30 gallons of KOPPERS No. 1 SUB-FLOOR TAR at the same temperature. The mixture is spread evenly over the slab to a thickness of from 1¼" to 1½" and leveled with a straight edge.

Well dried or treated planks are laid on this soft mixture



before it cools and bedded by hammering, so that the coating compacts to a thickness of 1". If any plank is hammered below level, it is raised and more of the mixture applied beneath it. After the planks have been brought to proper level they are toenailed together. The sub-floor planks are preferably pressure treated with coal tar creosote meeting the Grade 1 specifications of the American Wood Preservers' Association. In food factories, creameries, etc., where the odor of creosote might be objectionable, the planks should be treated with a suitable salt preservative such

as zinc chloride or Wolman salts. Planks to be creosoted should be dried before treatment. When a salt preservative is used, the planks should be dried after treatment, whether or not they were dried before treatment.

The finish floor is then laid at right angles or diagonal to the planks in the usual manner.

KOPPERS produces creosote, and treats wood with creosote, zinc chloride and Wolman salts. Complete information about creosote or treated lumber sent on request.

KOPPERS DAMPPROOFING—HIGH PENETRATION METHOD

USES. KOPPERS HP Primer is used with KOPPERS Seal Coat for protecting cement concrete against the disintegrating action of water. Concrete is permanent only when it is protected from the alkalis and sulphates often found in ground, lake, and sea waters. Continued contact with water also changes the structure of some of the chemical constituents of cement concrete, thus causing the concrete to lose some of its inherent strength. KOPPERS HP Primer penetrates the surface of the concrete making it water-repellent. KOPPERS Seal Coat seals the surface thus protecting it from erosion. This treatment is used particularly for dampproofing foundations, bridge abutments, basement and retaining walls, culverts, reservoirs, dams, sumps, pits, vats, tanks, and sewage disposal plants. On reinforced concrete this treatment also gives added protection to the reinforcing steel.

KOPPERS High-Penetration Primer and Seal Coat meet the United States Bureau of Public Roads, Specification TW-1-X and TR-1-25.

DETAILED SPECIFICATION

POURED CONCRETE

APPLICATION. Note—The concrete need not be thoroughly dry. Application of the HP Primer can begin as soon as forms are removed.

First—Apply with a brush, or spray a uniform coating of KOPPERS High-Penetration Primer over the entire surface to be protected. This first coating usually is absorbed as applied.

Second—Immediately apply in the same manner another coating of KOPPERS High-Penetration Primer over the first coating, allowing this coating to penetrate into the concrete.

Third—Repeat the same application as described under No. 2 until four (4) coatings have been applied. The last coatings may require one (1) or two (2) hours to be absorbed.

Fourth—Apply over the entire surface with a brush one (1) application of KOPPERS Seal Coat. This material shall be applied at a temperature from about eighty (80) to one hundred (100) degrees Fahrenheit. Allow the KOPPERS Seal Coat to dry thoroughly before disturbing the job.

Note—The application according to this specification will require about two (2) gallons of KOPPERS High-Penetration Primer and approximately one-half (½) gallon of KOPPERS Seal Coat per one hundred (100) square feet.

Superstructures—On Masonry superstructure exteriors, such as parapet walls, walls of buildings, etc., KOPPERS Lumino is used over HP Primer to give the surface an aluminum finish. Send for the Lumino folder.

PRECAST CONCRETE

Note—The precast piles or slabs shall be reasonably dry.

First—Prepare a bath of KOPPERS High-Penetration Primer large enough to accommodate the precast units and completely immerse these units for at least thirty (30) minutes, then remove the units from the bath and allow to drain and dry thoroughly.

Second—Apply a coating of KOPPERS Seal Coat, brushing thoroughly into the surfaces. The Seal Coat shall be applied at a temperature of from eighty (80) to one hundred (100) degrees Fahrenheit. Allow the Seal Coat to dry before disturbing the job.

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KOPPERS MEMBRANE WATERPROOFING

KOPPERS Membrane Waterproofing is constructed in place by mopping plies of KOPPERS Tar Saturated Open Mesh Cotton Fabric and/or KOPPERS Approved Tarred Felt with KOPPERS Waterproofing Pitch. This produces a strong, elastic, continuous waterproofing blanket.

USES. KOPPERS Membrane Waterproofing below ground excludes moisture and water under head from basements, cellars, tunnels, shafts, sidewalk vaults, storage pits, sumps, etc.,—and the loss of water is prevented through reservoir walls, concrete or masonry storage tanks, swimming pools, basins, etc. Above ground it is recommended to prevent the passage of water through railroad and highway bridge decks, elevated highways, stadiums, masonry standpipes, swimming pools, shower baths, and the floors of dairies, abattoirs, and hotel kitchens.

GENERAL SPECIFICATIONS

The number of plies of KOPPERS Tar Saturated Fabric and/or KOPPERS Tarred Felt to be used depends upon the maximum hydrostatic head. Three (3) plies, and four (4) moppings of pitch (total 140 pounds of pitch for each 100 sq. ft.) are used on floors, bridge decks, shower baths, etc., not exposed to excessive heads of water. Water reservoirs, deep foundations, etc., require additional plies and moppings of pitch. Membrane waterproofings constructed with tarred fabric are tougher and stronger than those constructed with tarred felts, but otherwise are not superior to the latter. Tarred fabric is recommended particularly for use on bridges, roadways, tunnels, railroad track and machine isolation, under heavily loaded columns and where the waterproofing is exposed to vibration. On some projects it is economical to use tarred felt in the lower plies and tarred fabrics in the outermost ply adjacent to the protection course.

PREPARATION OF SURFACE. All surfaces which are to be waterproofed shall be reasonably smooth and free from projections or holes which might cause puncture of the membrane. The surface shall be dry so as to prevent the formation of steam when the hot pitch is applied and, immediately before the application of the waterproofing, the surface shall be thoroughly cleaned of dust and loose materials. No waterproofing shall be applied in wet weather or when the air temperature is below 35° F. unless vertical surfaces are heated and dried by salamanders, and horizontal surfaces are heated for one to two hours with a two-inch layer of hot sand. After the concrete is warm and thoroughly dry, the sand shall be swept back as work progresses.

APPLICATION OF WATERPROOFING. First—Beginning at the low point of the surface thoroughly mop a strip of concrete with KOPPERS Waterproofing Pitch. This mopping and all succeeding moppings on the concrete surface shall cover the concrete so that in no place shall gray spots be visible. Immediately following the first mopping, press the first strip of fabric into the hot pitch so that it is smoothly and firmly bonded to the concrete.

Second—Mop the edge of the first strip of fabric and the adjacent strip of concrete with KOPPERS Waterproofing Pitch, and into the hot pitch press a strip of fabric so that it forms a two (2) inch side lap with the first strip.

Third—Repeat the above application until one ply of fabric with two (2) inch laps has been laid over that portion of the surface designated by the waterproofing engineer.

Fourth—Again starting at the low point of the surface mop the first layer of fabric with hot pitch so that all threads of the fabric are completely hidden by pitch and into this press a strip of fabric which has been cut so as to break joints at the middle, one-third ($\frac{1}{3}$) or other portion of the width of the first ply of fabric, depending on the number of plies to be used.

Fifth—Repeat the above application using full width fabric until two plies of fabric have been laid over the surface.

Sixth—Apply the third and succeeding plies of fabric in the same way, making sure that fabric does not touch fabric in any place.

Seventh—Mop the entire top with KOPPERS Waterproofing Pitch. The completed waterproofing shall be firmly bonded membrane, and fabric shall not be exposed in any place.

Eighth—As soon as any portion of the waterproofing has been completed it shall be covered by the specified protection course—concrete, brick, tile or other suitable material.

GENERAL. Laps—Each sheet of fabric shall overlap the preceding sheet not less than two (2) inches at the sides. End laps shall be staggered at least twenty-four (24) inches from the end lap of the preceding ply.

End laps shall be not less than ten (10) inches wide.

The waterproofing shall be applied so that the direction of the flow of water is over and not against the laps.

Laps which have been exposed for any length of time shall be carefully examined for defects before connecting with other fabric and where any defects or insufficient lap areas are found the protection course shall be cut back sufficiently to give a proper lap between the membrane in place and the new work which is being applied.

DETAILS. All plies of fabric shall be rolled or pressed firmly into the hot pitch and shall be laid without wrinkles, buckles or kinks.

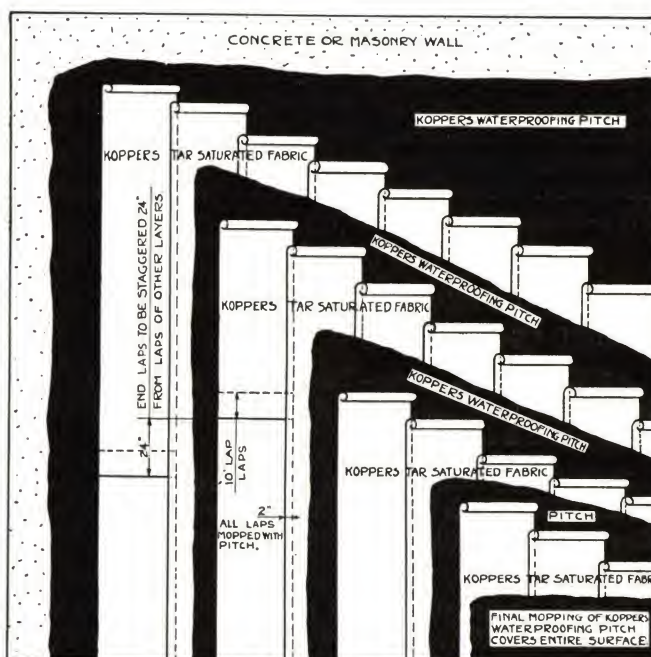
Pitch shall not be heated above three hundred and seventy-five (375°) degrees Fahrenheit.

All wall angles, corners or any place where in the opinion of the engineer or architect the waterproofing course may be subject to unusual strain there shall be applied on the water pressure side not less than two (2) additional reinforcement plies of fabric and moppings of pitch.

Insulate all hot water and steam pipes which project through or are near the surfaces to be waterproofed so as to prevent injury to the waterproofing. Extra plies of fabric and other precautions should be taken to prevent water from getting between the waterproofing and the waterproofed surface at all points where the membrane is penetrated by drains, pipes, etc.

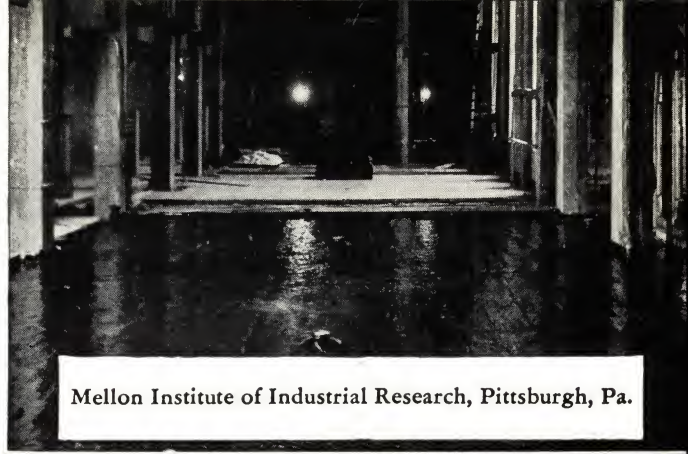
Plies of KOPPERS Tar Saturated Fabric or KOPPERS Approved Tarred Felt	Alternate Moppings of KOPPERS Waterproofing Pitch Required	Pounds of Pitch Required to Complete each 100 sq. ft. of Waterproofing
2	3	105
3	4	140
4	5	175
5	6	210
6	7	245

All membrane waterproofing shall be applied by an experienced waterproofing contractor.



Typical Application 4 Ply

STRUCTURES PROTECTED BY KOPPERS MEMBRANE WATERPROOFING



Mellon Institute of Industrial Research, Pittsburgh, Pa.



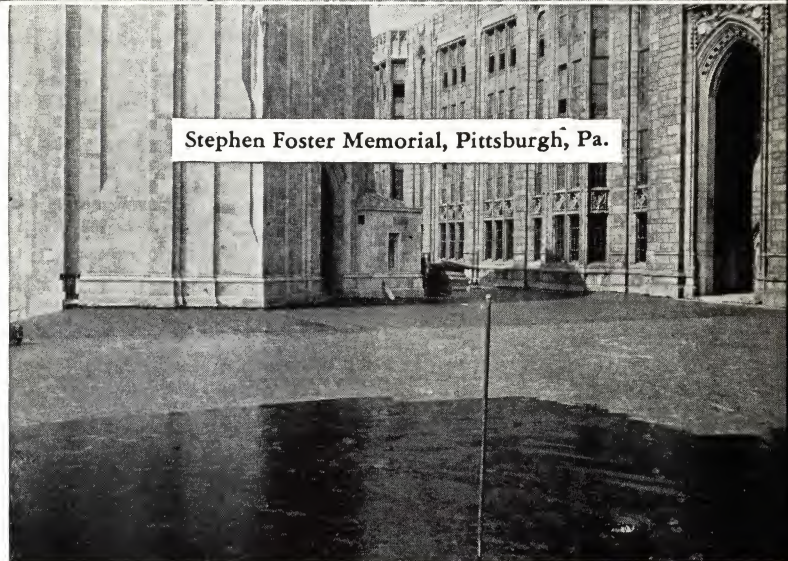
Westside Highway—W. 72 to W. 79 St., New York City.
Koppers Membrane Waterproofing used on this project.



Pennsylvania Railroad Bridge,
Washington, D. C.



Applying Koppers Membrane Waterproofing on
the foundations of the Allegheny County Home
at Woodville, Pa.

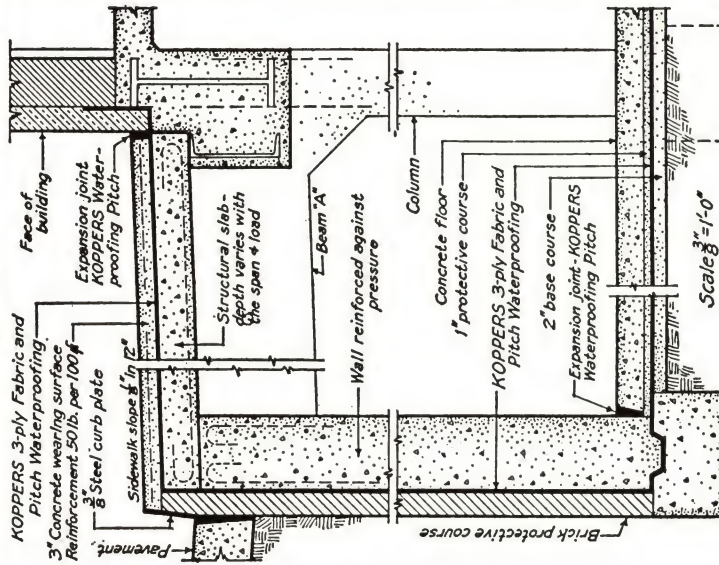


Stephen Foster Memorial, Pittsburgh, Pa.

Koppers Waterproofing on the sludge digestion tanks at the new sewage treatment plant at Columbus, Ohio, where it serves as a gas-proof as well as water-proof covering. (In the background is a gas holder produced by Koppers' Bartlett Hayward Division.)



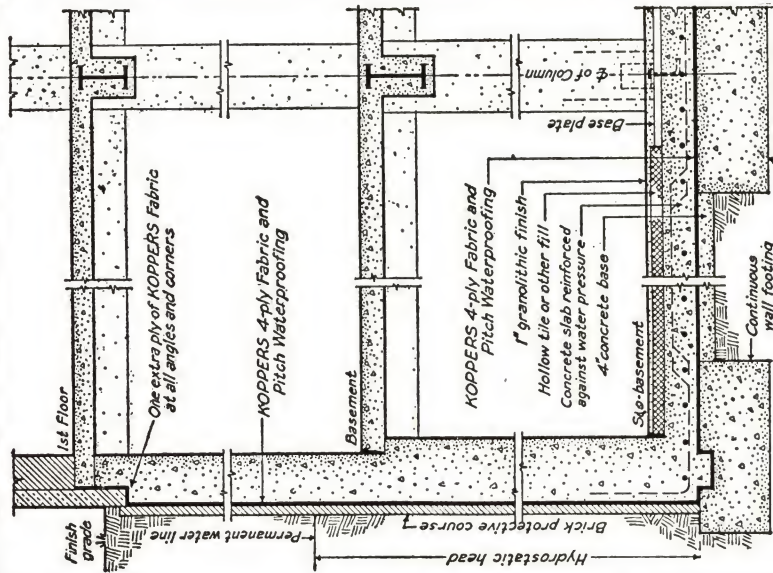
PENCIL POINTS DATA SHEETS
**WATERPROOFING OF
SIDEWALK VAULT**
Prepared by Don Graf, B.S., M.Arch.
Sheet No. **F9**
**KOPPERS
COMPANY
PITTSBURGH**



Expansion joint - KOPPERS
Waterproofing Pitch

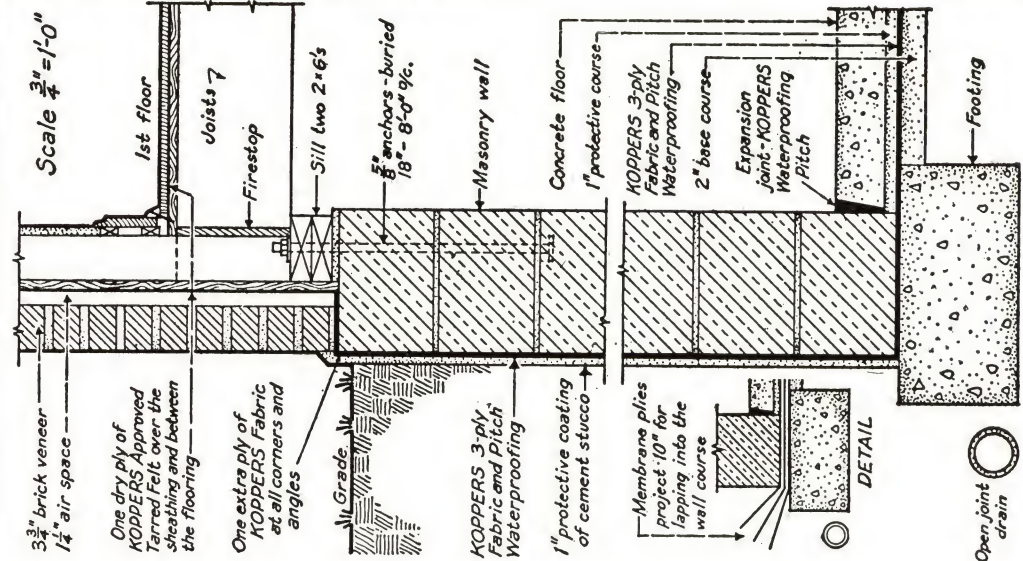
The problem involved in constructing sidewalk vaults is to provide for movement of the concrete to eliminate cracking, and at the same time to exclude water so that the space may be usable. A 1\" expansion joint should occur at the building line as shown. Others should occur at proper intervals at right angles to the building face as shown in the detail at the left. The membrane acts as a flexible dam in the joint, retaining the filling of pitch. To facilitate the movement of the slabs, 2 dry plies of Koppers Approved Tarrred Felt are placed between the bottom of the slab and its bearing surface on beams or wall, thus breaking the joint.

PENCIL POINTS DATA SHEETS
**WATERPROOFING OF
DEEP FOUNDATIONS**
Prepared by Don Graf, B.S., M.Arch.
Sheet No. **F9**
**KOPPERS
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PITTSBURGH**



In the construction of deep basements having unfavorable water conditions, the waterproofing method is shown here. The Koppers 4-ply Fabric and Pitch Waterproofing membrane will withstand a hydrostatic head up to 18'. From 18' to 25' 5 plies are used. A sheet of 20-oz. soft-rolled copper should be placed between the plies beneath all columns, posts or walls under which the pressure exceeds 400 lbs. per sq. inch. The sub-basement floor is reinforced as a flat slab to resist the upward pressure of the water. Inverted beams may be used, but these necessitate a greater amount of fill to bring the construction to a level to receive the wearing surface. If piles are used, the footings shown above become the pile capings. No dowels need be run through the membrane.

PENCIL POINTS DATA SHEETS
**WATERPROOFING OF
RESIDENCE FOUNDATIONS**
Prepared by Don Graf, B.S., M.Arch.
Sheet No. **F9**
**KOPPERS
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Open joint
drain

PENCIL POINTS DATA SHEETS
Sheet No. D6
KOPPERS COMPANY
PITTSBURGH

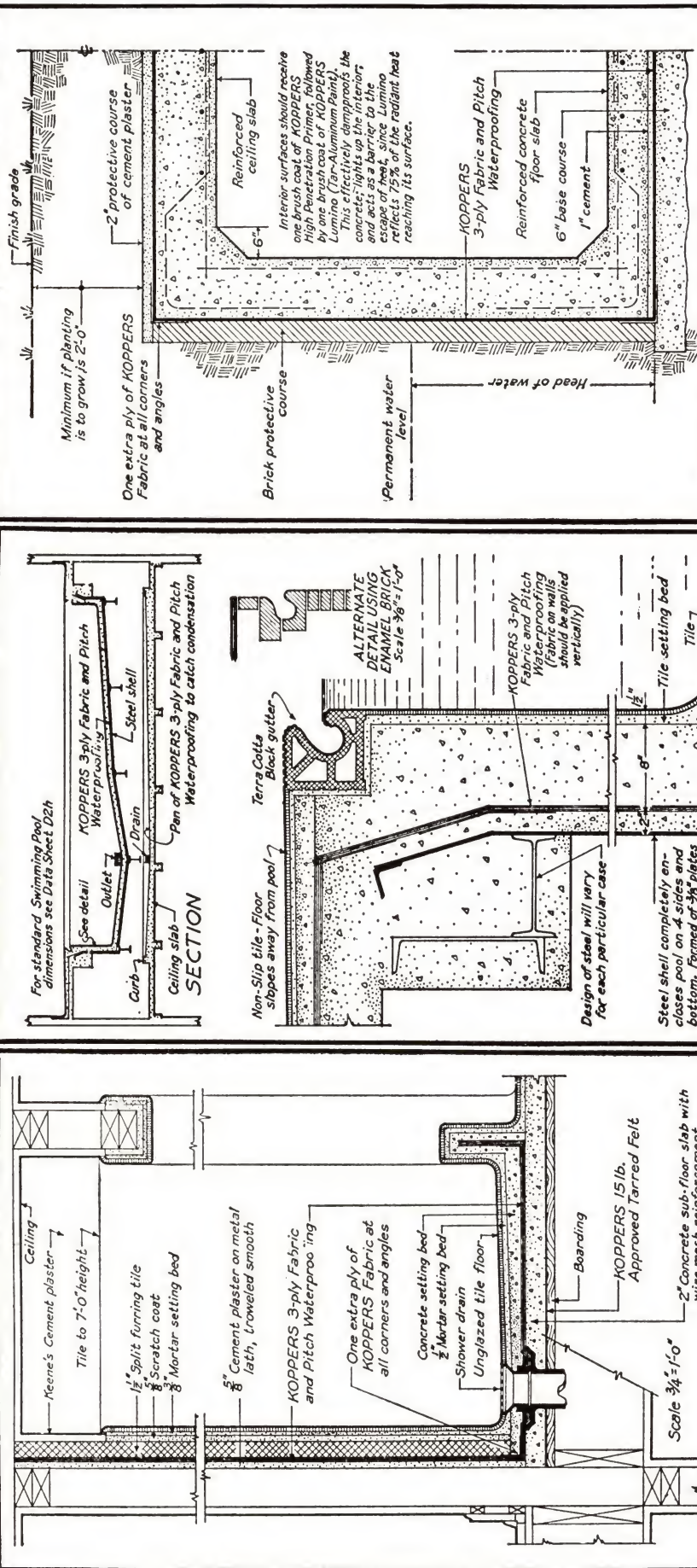
SHOWER BATH CONSTRUCTION
Prepared by Don Graf, B.S., M.Arch.

PENCIL POINTS DATA SHEETS
Sheet No. D2
KOPPERS COMPANY
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INDOOR SWIMMING POOL
Prepared by Don Graf, B.S., M.Arch.

PENCIL POINTS DATA SHEETS
Sheet No. F9
KOPPERS COMPANY
PITTSBURGH

SUBTERRANEAN TUNNEL TO CONNECT BUILDINGS
Prepared by Don Graf, B.S., M.Arch.



The usual sizes for shower stalls are as follows:—30 x 36, 30 x 42, 36 x 36, 36 x 42, 42 x 42. Where space permits, the largest size given is desirable. Showers less than 36 x 36 in the clear should only be planned when space conditions make it mandatory. The door opening may be closed either with a water-proof curtain or any of the standard shower stall doors having ventilating panels.

The floor of the shower should be of an unglazed or abrasive tile, to prevent slipping. Glazed or unglazed tiles may be used for the walls at the discretion of the designer. Floor drains vary from 1½" to 3" wastes. The larger the better.

TYPICAL DETAIL OF SIDE WALLS
Scale ¾"=1'-0"

ALTERNATE DETAIL USING ENAMEL BRICK
Scale ¾"=1'-0"

SECTION

For standard Swimming Pool dimensions see Data Sheet D2h

Scale ¾"=1'-0"

OTHER KOPPERS PRODUCTS

ROAD MATERIALS

Koppers Tarmac—

For construction, maintenance and repair of highways, streets, private driveways, plant roads, pavements, playgrounds, etc.

WOOD PRESERVATIVES

Koppers Coal Tar Creosote
Koppers Creosote-Coal Tar Solutions
Koppers Anthracene Oils
Koppers Kolineum
Koppers Shingle Stain Oils

PITCH COKE

A low ash carbon for the chemical and metallurgical industries

CRUDE NAPHTHALENE

Standard 74°, 76° and 78° grades

CRUDE TAR

Coke Oven Tar Vertical Retort Tar
Horizontal Retort Tar Water Gas Tar

REFINED TAR

Mold Wash Tar Pipe Dip
Fish Net Tar Saturating Tar

TAR ACIDS AND TAR ACID OILS

Phenol (82% and 90%)
Cresol (U. S. P., 3° Meta-Para
Resin and plasticizer
grades)
Cresylic Acid (Disinfectant and
insecticide grades)
Tar Acid Oils (15-25-35%)
Flotation Oils

LIGHT OILS

Benzol Nylol
Toluol Solvent Naphtha

AGRICULTURAL PRODUCT

Tree Spray Oil

BITUMINOUS PAINTS

Koppax Black Paints
Lumino Aluminum Paint
Heat Resisting Paints
Acid-Proof Paints
Paint Base Tars and Pitches

PRESSURE-TREATED WOOD

Treated Joists	Treated Structural Lumber
Treated Sills	Treated Roof Stringers
Treated Posts	Treated Poles
Treated Sub-Flooring	Treated Piling
Treated Foundation Timbers	

Also all other types of treated wood, including ties, guard rails, posts, culverts, bridge material, etc.

KOPPERS COMPANY

Tar and Chemical Division

PITTSBURGH, PENNSYLVANIA

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